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WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXIV. No. 1908.] LONDON, DECEMBER 5, 1899. [51ST YEAR. PRICE 6d.

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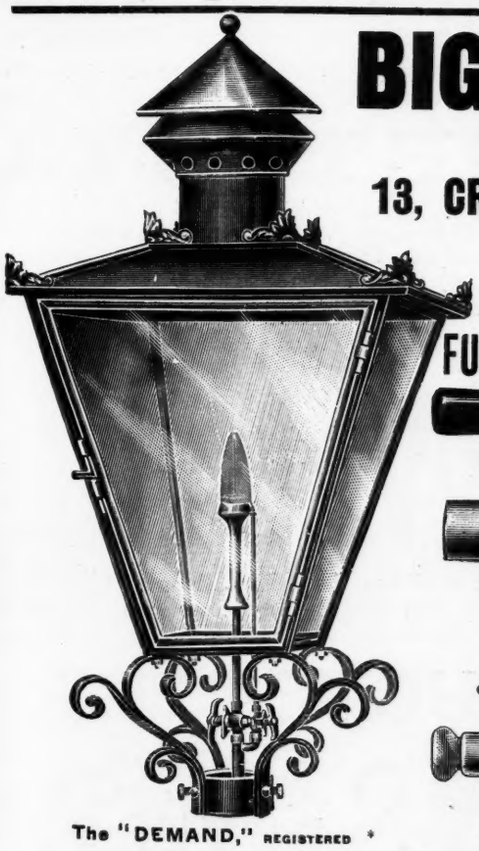

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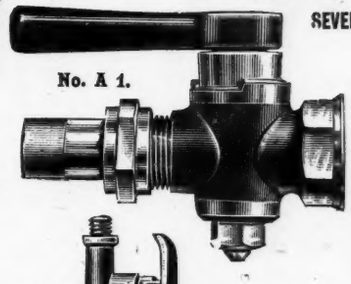
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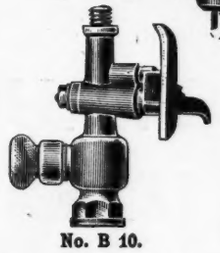
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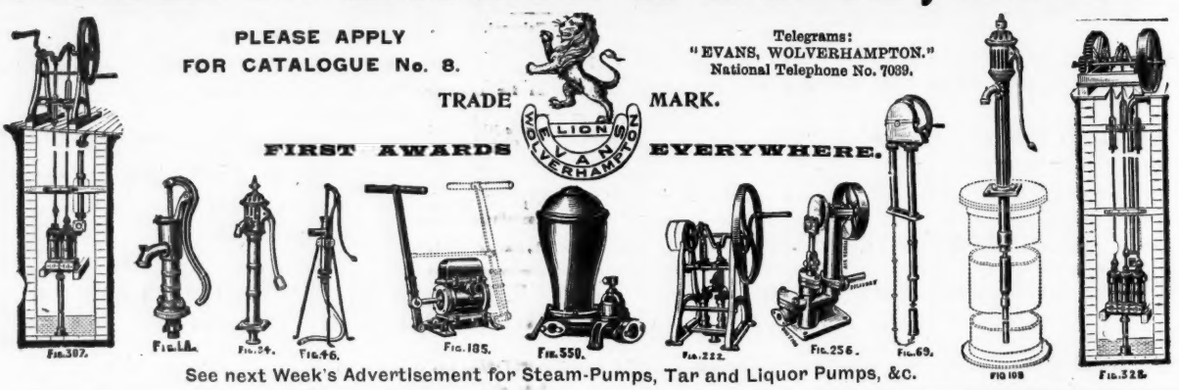

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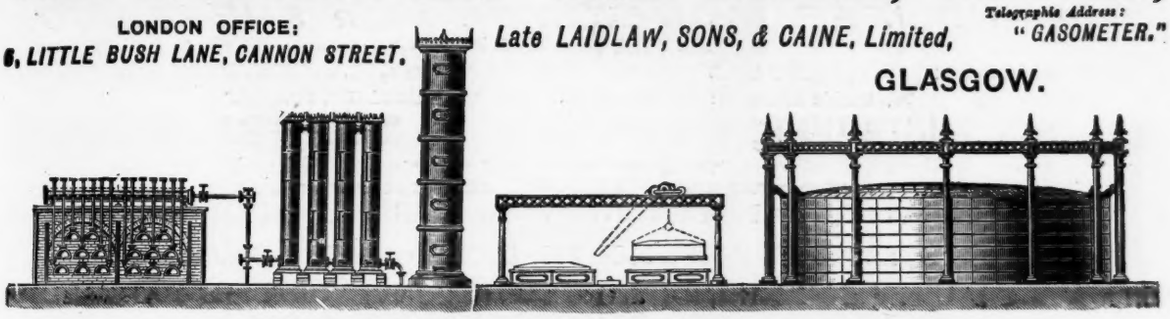

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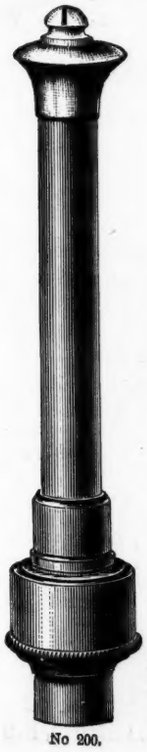

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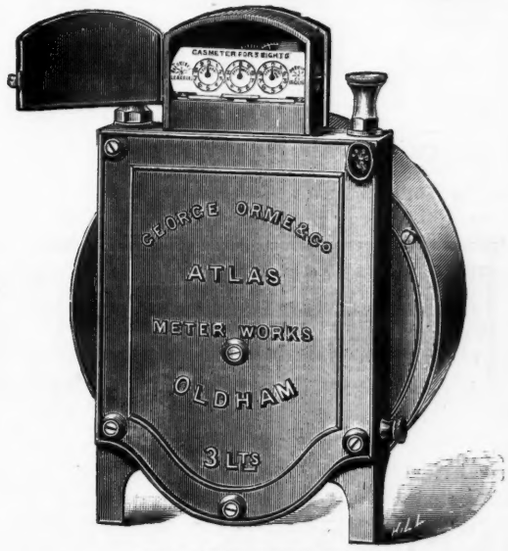

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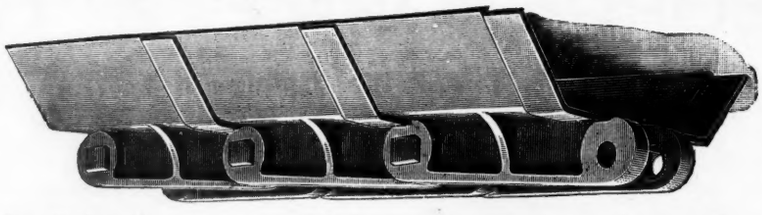

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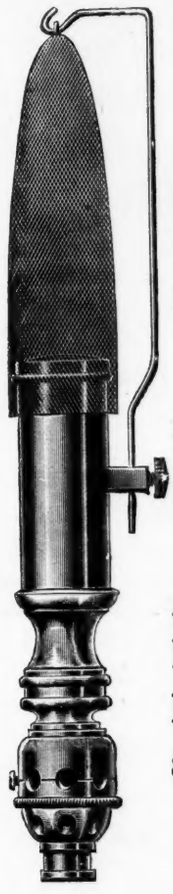

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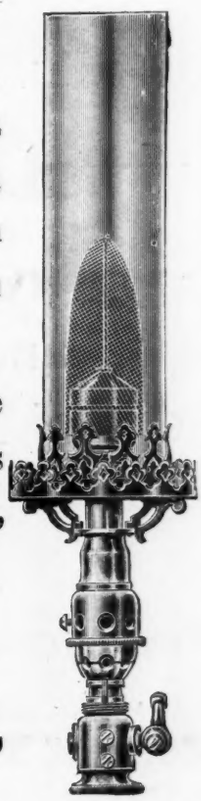

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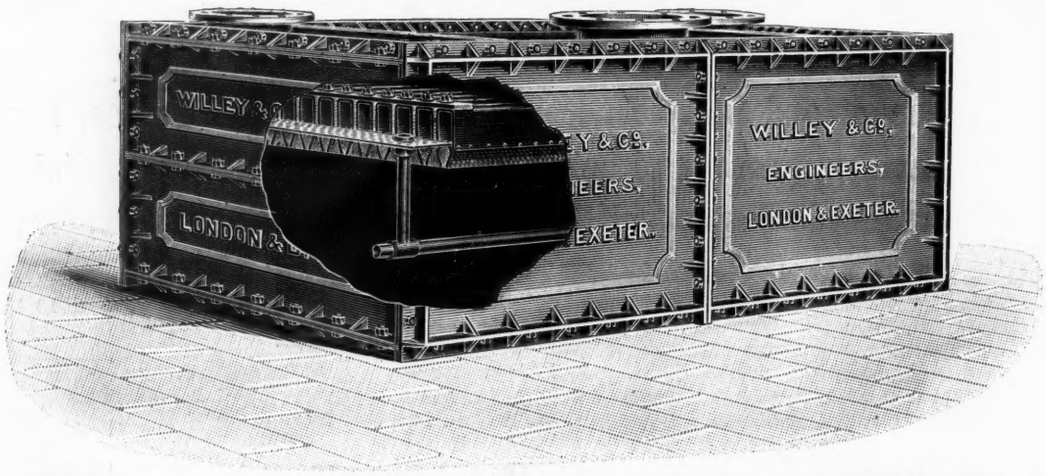

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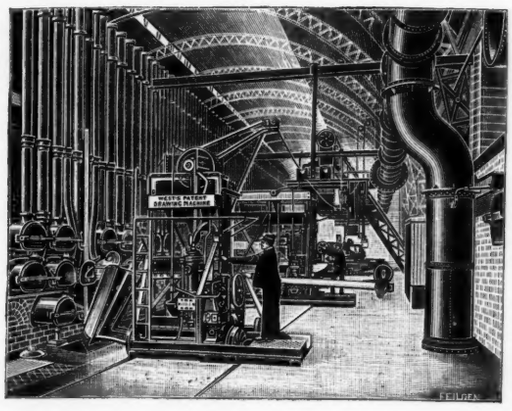

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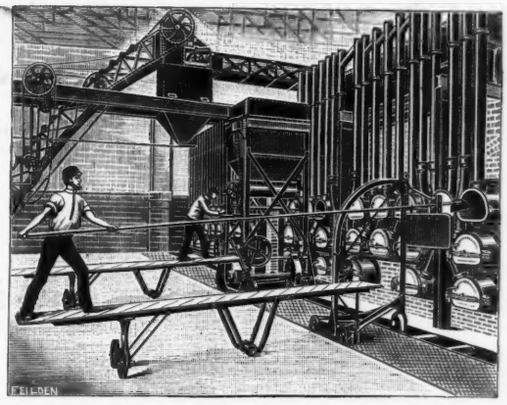

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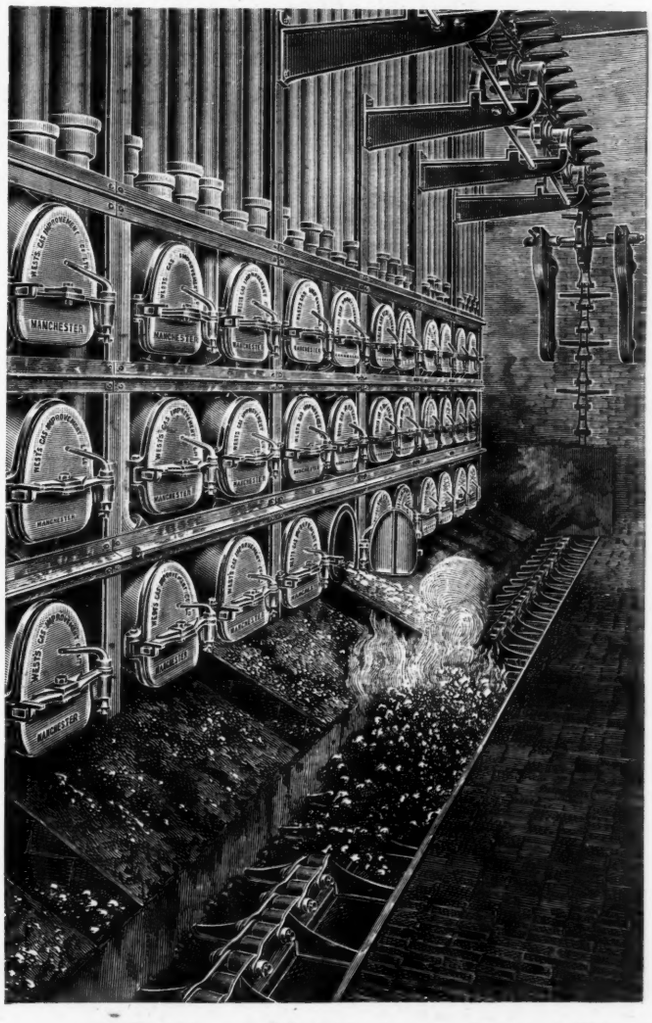

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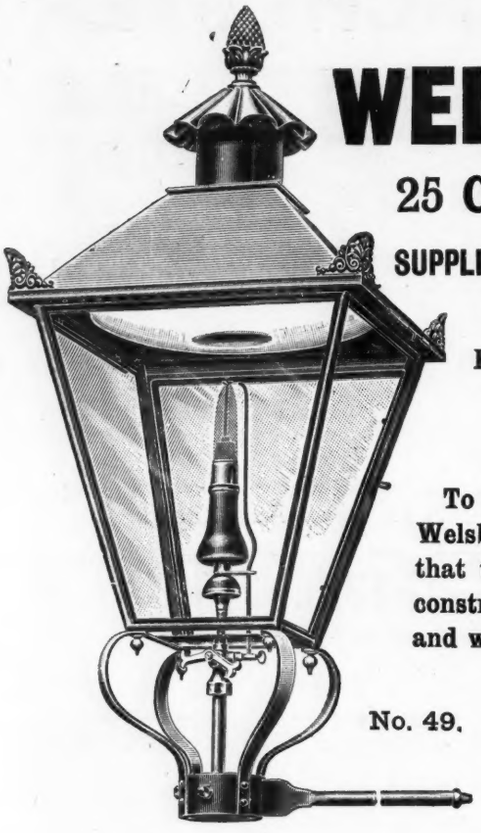

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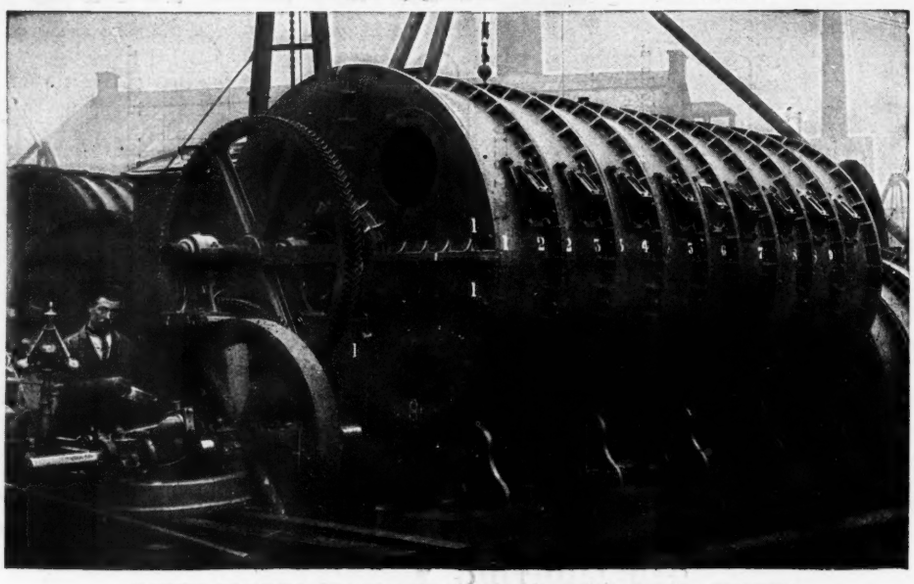

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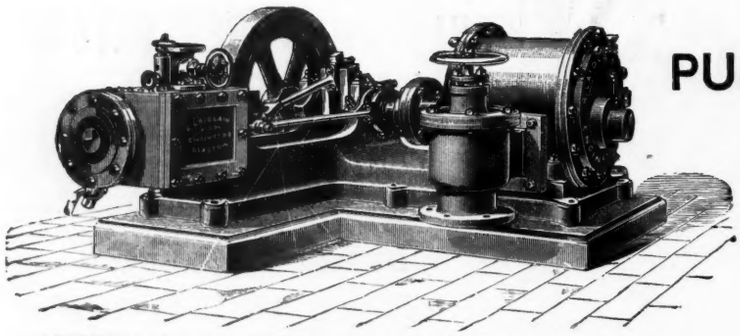

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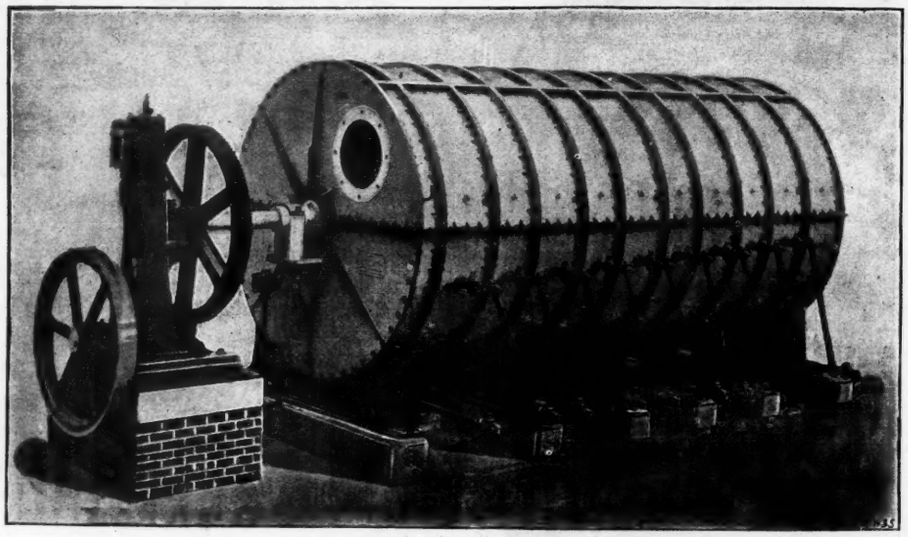

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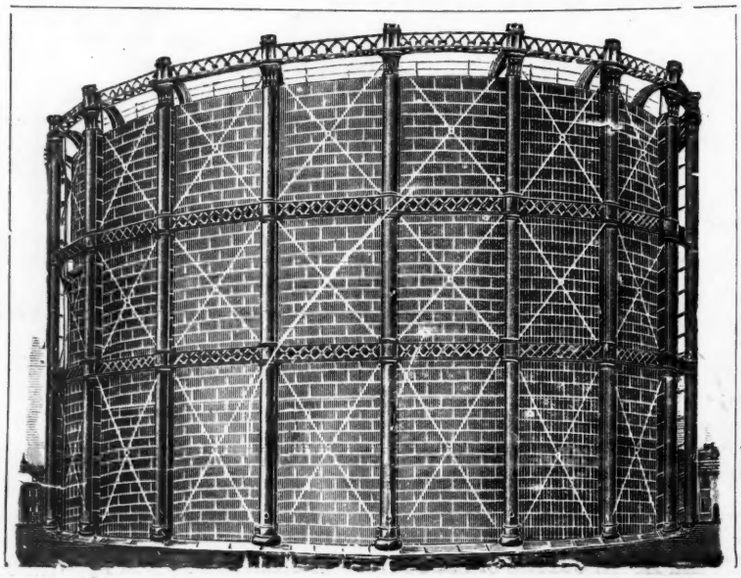

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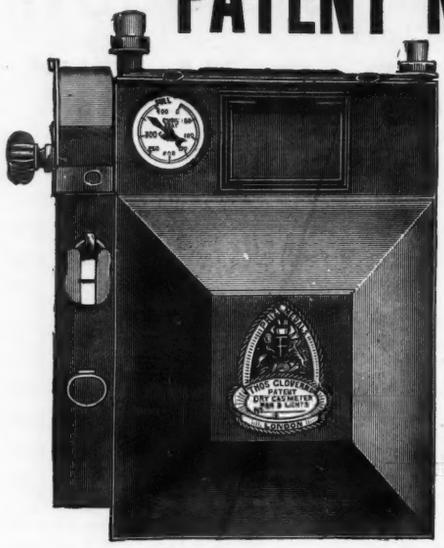

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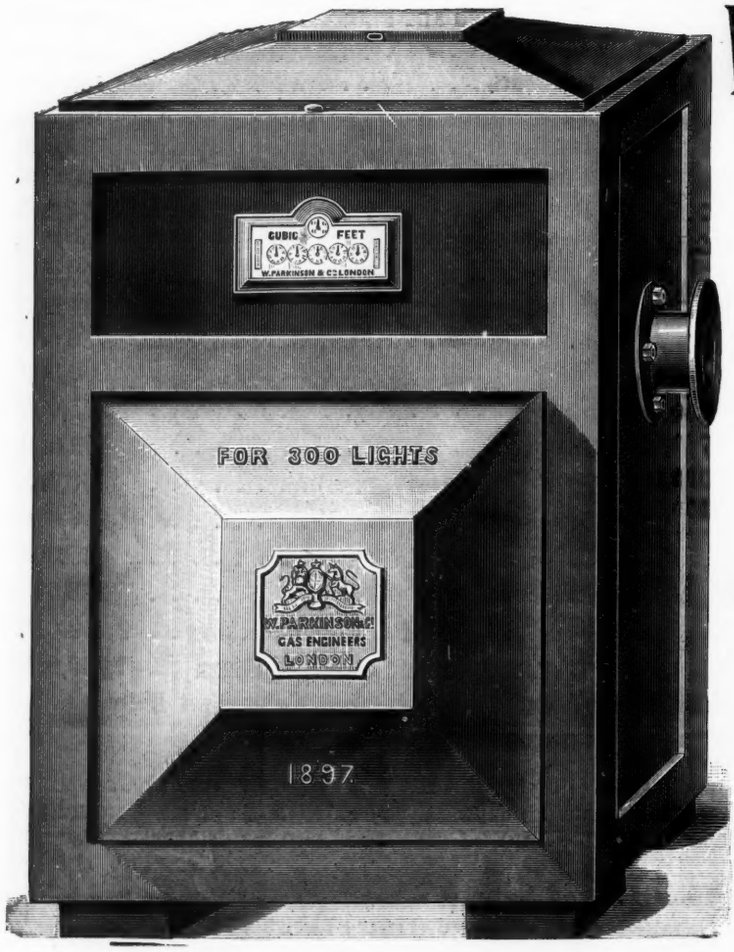

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EDITORIAL NOTES.

A Low-Grade Gas Bill.

GAS managers throughout the country must have been made to "sit up," as the expressive vernacular has it, when they read in their "JOURNAL" that the South Metropolitan Gas Company propose to take the opinion of Parliament on the question of linking the standard price of gas to a standard illuminating power. Not being in the counsels of the Old Kent Road authorities, we have no commission to explain the origin of this fresh movement on their part, and have certainly not received any inspiration from Mr. Livesey intended to prepare the way for the full disclosure of his purpose and reasons which will be given at the proper time. It seems prudent to state this much, in view of the fairy tales that have been told aforetime to the detriment of the reputation of the "JOURNAL" for independence. The question to be laid before Parliament is of such great and general interest, that no other excuse is needed for speculating upon the policy that has brought it forward at this time. It looks, at the first glance, as though the South Metropolitan Directors, like the London County Council, felt called upon to do something in response to the recommendations of the Powers of Charge Committee. It is a remarkable illustration of the unsystematic, illogical, experimental character of the British way of legislating for the regulation of important undertakings, that the deliberate counsels of a Committee of Parliament in such regard should be tossed, as it were, into the arena, to be torn into pieces for different interests to run away with, if they can. In this case, we see the London County Council pouncing upon one or two shreds of the recommendations; the Gaslight and Coke Company apparently holding aloof, because they so sadly want money first of all; and the South Metropolitan offering to fall in with one point of the Committee's finding, and proposing a variant on another.

The position of the Gaslight and Coke Company may be left outside the discussion, for the present. It would not be very surprising, however, if after a while the Horseferry Road were to be found on the side of the London County Council, and in opposition to the South Metropolitan, in regard to the suggestion to alter the illuminating power of London gas. The Chartered apologists might say that theirs had always been a high illuminating power gas. They have already urged the superior light-giving power of their gas as partially explaining its high price. They might stick to the same plea, and carry it a stage farther by declaring that, whatever others might do, they will never, never supply the gas consumers of their part of London with a lower grade of the article than they distribute at present. How far such a declaration would go with the London County Council, and incline this authority to look more favourably on the Company's administration generally, it is quite impossible to say. It may be taken as highly probable that the County Council would make a careful note of such a profession, and proceed to take powers for verifying it by the aid of the portable photometer. Now, it is scarcely necessary to remark that, if any make of gas has reason to fear the portable photometer, it is the highly-carburetted brand.

Upon this ground, it does not seem an extravagant supposition that the South Metropolitan Company will be able to use their illuminating power proposal as a counter to the attempt to legalize the portable photometer. We do not for a moment wish to disparage the powerful defence which the Gas Companies have already at command to meet this insidious and plausible attack. As the "Builder" has very truly observed upon the County Council proposal, it is tantamount to making the vendor of the commodity responsible for its preservation after it has passed out of his keeping and into that of the purchaser. It would be as just to take samples of a water supply for analysis from the house cistern. Moreover, the proposal is in direct contrariety to the whole course of legislation upon the subject. In the great majority of cases, the product is only tested at the gas-works. Where the works are far removed from the centre of population, Parliament takes care that this topographical necessity does not prejudice the consumer, by requiring the supply to be tested in its condition after transmission. The rule in the case of London gas is precisely the same. The gas-testing stations have reference to the

works, not to the service-pipes. It is the loss of illuminating power due to transmission in bulk that has to be made good by the manufacturer; not waste of retailing. Transmission is one thing; distribution is another.

The South Metropolitan Company propose to take powers for sending out gas of a different quality, as regards illuminating power, from the actual statutory supply, which must be over 16-candle power at the testing-stations, subject to a correspondingly decreased standard price and rate of dividend. The selling price would be less, as a matter of course. This is apparently left to be understood; but naturally the figures relating to the whole scheme will be set out. All that we seek to establish, in now mentioning the subject, is that the idea is not a new one. The suggestion that it is more economical to all parties to make and distribute what is comparatively speaking a "low-"grade" illuminating gas, instead of gas of a high photometrical test, is not only old, but it has long been acted upon. To some extent, the matter is a question of degree; and here the example of the tendency of Scotch gas-making practice is in point. For many years, also, Mr. George Livesey has argued in favour of extending the lesson of Scotch experience to all coal-gas manufacture. In 1894, as our volumes for this period record, the South Metropolitan Company tried the experiment of sending out, for a fortnight, what Mr. Livesey calls natural coal gas—that is, gas made by carbonizing the kind of coal which can be had most economically for the purposes of local business, without any carburetting whatever. Professor Lewes strongly backed up this principle in gas supply, which was also endorsed by Mr. Newbigging, Mr. Hunt, Mr. Sugg (who made effective use of the example of Paris), and Herr von Oechelhaeuser.

It should be pointed out that the economic movement in favour of low-grade coal gas began before the issue was complicated either by the general acceptance by the public of the Welsbach burner, or by the adoption to a large extent by British gas-works of carburetted water-gas plant. The Scotch abandonment of the very highest grade of cannel gas, Mr. Livesey's definite pronouncement in favour of "natural" coal gas, and the arguments of all the other named advocates of the reform, with the exception of Herr von Oechelhaeuser, either antedated or were not much concerned with either of these complications. It is worth while to read up the literature of the subject in our pages. Now, however, it is impossible to ignore the complications mentioned. The Welsbach burner has rendered the consumer more than ever independent of the nominal illuminating power of his gas supply; and so far the way to a cheaper low-grade supply is made easier. On the other hand, the consumer might reasonably object if the low-grade gas sent out to him at a diminished price were merely lightly-greased water gas. The consumer's major interest, in short, has shifted from the nominal illuminating power to the actual available calorific value of his gas. All these considerations, with others that remain behind, lend the highest interest to the South Metropolitan proposal. There will be sure to be differences of opinion as to its character; but we believe the bulk of professional judgment will regard it as a step forward.

Trade Unionism and Rates of Wages.

THE correspondent who has undertaken to say a good word for Trade Unionism in our columns, in opposition to what he believes to be our too one-sided view of the subject, returns to the charge undismayed by what we had fondly regarded as an exposure of a fatal confusion in his former premises. Of course, if he holds that the two expressions "rate per ton" and "rate of wages" really hang together, there is no more to be said. He wants to prove, however, that an advanced rate of wages necessarily results in an increased cost of work. If he knows, he should have admitted that the rate of gas workers' wages all over London is the same. Not to limit the discussion to a comparison of the Gaslight and Coke and South Metropolitan working costs, he should have taken in the Commercial. Let him do this, and then consider how it is that the South Metropolitan Company, paying their men the same rate of wages as the others, and adding thereto a share of the profits of the undertaking which the others do not get, yet continue to show a lower "rate per ton" than any. This is the first point. With regard to its bearing on the general problem of cost of work and rate of wages, it may be remarked that a convincing proof of the argument that higher wages necessarily means dearer work would be one of the most terrible of all checks to the elevation of the condition of the labouring classes. The older order of Political Economists held this view firmly; and great was the pity of it.

In order to avoid any more confusion, it would be as well for our correspondent to disabuse his mind of the belief (which he evidently holds) that the introduction of the eight-hour shift into London gas-works in the early part of 1889, which undoubtedly increased the cost of carbonizing, was either a triumph of Unionism or an unmixed benefit to the men. Reference to the chronicles of the period will show that the obtaining of the eight-hour shift was forcing an open door, so far as the good-will of the employers was concerned. The Gas Workers' Union fully intended it to serve as a means to ulterior ends. They meant it to necessitate the employment of more men; and they endeavoured to shut out from the employment all who were not members of the Union. When they had supreme power, they meant to have another shilling a day immediately, and to prevent the introduction of the "iron "man" or any other labour-saving device. Inferior as are the working results of Union-ridden London gas-works to-day, in comparison with the South Metropolitan performances, the mischief of recognition of the Union is really as nothing in comparison with what would have been the consequences of yielding to its 1889 demands.

We do wish our esteemed correspondent would accept our repeated invitation to look up the testimony of Mr. Ransome on the point which he disputes—as we conceive, with more sentiment than regard for facts. It is really impossible to argue out this subject on the analogy of the "bundle of sticks," or any theoretical consideration of this sort. Our correspondent reminds one of Pope's couplet —"For forms of government let fools contest. Whate'er "is best administered is best." Everything depends upon the working out. It were an endless task to follow our genial critic into the positions which he takes up, one after another, either with the object of attacking what he conceives to be our views or of defending his own. He conveys the impression throughout that he is thinking of what Trade Unionism ought to be or might be; while we have learnt to look more carefully at what it is and does. He sees the bundle of sticks; we see the "walking "delegate," the "branch secretary," and the "union "stroke." But let him be fair. He tries to fasten upon one of our remarks the equivalent interpretation that "no employer whose men belong, for defensive purposes, "to a Trade Union, is either hard or selfish." Clearly, this is misrepresentation.

The sense of the last paragraph but one of this week's letter we really cannot grasp at all. Nobody would be foolish enough to contend that organization, or even a football match, is not competent to interfere for a certain time, and to a variable degree, with the operation of what, for the sake of brevity, is called the "law" of the action and reaction of supply and demand in the field of labour. Argument, however, is endless. Incontestably, on the face of it, the Trade Union system looks well. The best evidence of this is the ease with which it permeates many occupations. The employers are not asked for their consent. Perhaps they are by temperament and political bent favourable to the idea. Too often, unfortunately, there is a rude awakening, which is generally administered by the action of some blatant individual, of whom the employer never heard, in demanding "recognition" as a Paramount Power. It may be a mistake; but our belief is that if any Trade Union could rightly claim to have "forced" up the rate of wages to the extent that has been realized, say, in domestic service, by ordinary economic process, the Organizing Secretary of that Union would put on more than the airs of a Peacock Feather Mandarin. Agricultural labourers' wages is another example in point. Is it, or is it not, the fact that farm servants' pay is higher now than it ever was during the heyday of Joseph Arch's Union?

Common Sense on the School Board.

THE adjourned debate of the London School Board on the proposal to appoint an Underfed Children Committee (to provide free meals to the children of such parents as cannot or will not feed them), was concluded on Thursday last, and resulted, as we had hoped, in the defeat of the proposal. An amendment moved by Sir Charles Elliott (Chairman of the Finance Committee) was finally adopted—by 35 votes to 14—by which it was resolved that

the whole question should be referred back to the General Purposes Committee, from whom the proposal emanated, with instructions to submit fresh recommendations which, while involving no expenditure of public money on the supply of food to children, should provide for the efficient organization of charity administered by local voluntary associations or by individuals. Common sense has thus, by a most satisfactory, if unexpectedly decisive, majority, given the *coup de grâce* to a proposal, especially cherished by the Fabian Socialists on the Board, which would have saddled the ratepayers with the expense of providing meals, not only for those actually in urgent need of food, but also for the children of the many parents who would gladly shift the burden from their own shoulders, and swell the publicans' profits with the saving thereby effected —and this at the expense of that portion of the community who would respect themselves sufficiently to refuse to have their children fed by the public. For it must not be forgotten that, although the majority of artisans are not directly ratepayers, the rents of their dwellings are affected by the rates levied on their landlords. We are not surprised to see that the Rev. A. Jephson, who has had many years' personal experience among the poor, declared that in his parish the decent artisans and mechanics were dead against the proposal.

The following quotation will give our readers some conception of the aims and objects of the Fabian members of the Board. It is from an article by Mr. Graham Wallas, member for the Hackney Division of the School Board area, and one of the leaders of the Fabian Society: "If this generation were wise, it would spend on education, "not only more than any other generation has ever spent "before, but more than any generation would ever need "to spend again. It would fill the school buildings with "the means, not only of comfort, but even of the higher "luxury. It would serve the associated meals on tables "spread with flowers, in halls surrounded with beautiful "pictures, or even, as Milton proposed, filled with the "sound of music. It would seriously propose to itself the "ideal of Ibsen, that every child should be brought up a "nobleman. Unfortunately, this generation is not wise." Fortunately, for the poor ratepayer, this generation, as represented by the majority of the School Board, is wise enough not to heed, or to heed only to reject, the advice of such dangerous dreamers, who wish to introduce into this human world systems dependent for their success upon the possession of super-angelic qualities by one and all. We wonder if the ratepayers of Hackney are familiar with the passage we have quoted! The admittedly difficult question of dealing with the utterly destitute children who are compelled to attend Board Schools, but are—by reason of their physical condition—obviously incapable of being taught, is, then, brought back to its proper sphere. It is a problem that can only be satisfactorily dealt with by local and private charity, by means of which it has, indeed, been already in a large measure solved. The better co-operation of the School Board authorities with the charitable associations which have done so much good work in the past, and a stimulation of the public mind to the necessity for the support of such bodies, will, we hope, be the good resulting from the discussion of a proposal which we are rejoiced to think has been definitely quashed.

The Fussy London County Council Again!

READERS of the daily newspapers who desire to get the largest amount of instruction and amusement thereby, should be careful to make proper allowance for the imperfect focussing of topics of passing interest by the journals they patronize. The operation of getting all objects into focus is largely affected by the point of view. There are some things the newspapers seem incapable of focussing aright—always obtaining blurred or distorted outlines. Among these, statutory supply undertakings are usually to be classified. By way of compensation, the same newspapers which can see nothing but monopolistic greed in the doings of Gas or Water Companies, commonly exalt out of measure the Local Authorities which habitually make themselves most disagreeable to "monopolists." It is vain to expect a newspaper to take the same view, say, of the London County Council as that perforce adopted by a Metropolitan Gas or Water Company, or by the lamp trade. The ordinary journalist cannot see that the London County Council is a "fussy" body, as we have characterized it, when the question at issue is one of photometry, of water examination, or the flash-point of burning oil. He does not understand these matters, and so is inclined to side with the public authority, on general grounds. Sometimes, however, the professional exponent and registrar of public opinion has his eyes opened to perceive municipal meddling with something which he does in a way understand; and then he can denounce Bumbledom as loudly as any "vested interest." Not very long ago, for example, the London County Council made itself disliked by senselessly interfering with Lord Rowton's endeavours to provide improved lodgings for the London poor. The Council have lately repeated the spirit of this performance, by trying to wrest out of its channel the law relating to Sunday concerts.

The subject is mentioned here as an illustration of the occasional arbitrariness of local authorities which even "the man in the street" can appreciate. There is an influential party in the London County Council who much object to Sunday concerts, just as there is a party who do not love Water Companies, and have a fancy for plaguing the Gas Companies and dealers in lamp oil. The anti-concert party have hit upon the notable idea of laying an embargo upon all Sunday entertainments of the kind which are given "for private gain, or by way of trade." This distinction, as even the "Daily News" is obliged to point out, is nugatory. It is not for the London County Council to make the law other than it is. "The proviso against "profit or gain is not justifiable, and cannot be enforced." Just so; and the observation applies to other turns of the County Council screw. But there is more to follow. A Society has been formed to carry on the Sunday concert movement; and a perfervid councillor has gone the length of declaring that the formation of this Society is an "insolent defiance of the Council." Hereupon the "Daily "News" very properly calls out "Gently! Gently! This "is a free country; and a society, even a musical society, "may be formed without the leave of the County Council." Just so, once more. This ridiculous pretension to set up the London County Council as a sacrosanct body, above even the breath of criticism, can be easily seen in its true light by the newspapers when the question at issue is one of licensing a music hall. We venture to represent that the same rule applies to other manifestations of County Council prejudice and fantasy, to give it no harsher name. If Sunday concert givers have their rights against the present Licensing Committee of the County Council, perhaps the "Daily News" and other respectable papers will be willing to grant at the proper time that even Gas and Water Companies are not beyond the pale of law and equity.

Six Per Cent.

THE continued rise in the price of money is not a cause for thanksgiving by those responsible for the working of undertakings which, as in a peculiar degree is the case with Gas Companies, depend for the prime foundation of their prosperity and for their complete success on cheap capital and cheap materials. The rise in the Bank Rate from 5 to 6 per cent., announced by the Directors of the Bank of England on Thursday last, will undoubtedly tend to further depress gas stocks, and gives additional emphasis to the advice we ventured to offer to gas managers last week—to postpone for the present all extension or reconstruction of works which is not absolutely and immediately necessary. We then referred to the high rates of wages current; and we may now add that the prospect of a further draft from the labour market of Army Reserve men for active service, and the high pressure at which many firms of contractors are working for the supply of stores to the Government, will not tend to slacken the already very active demand for hands. The war is, indeed, the main factor in the present rise in the Bank Rate, which had, as the outcome of a world-wide revival of trade, already been sent up to 5 per cent.—a figure to which the Money Market had (with one brief exception) been for a long while unaccustomed. It is, it may be observed, an experience to which modern times are unaccustomed to have a 6 per cent. rate caused by anything but a financial crisis and a failure of credit. The last occasion on which this rate was touched was that of the Baring crisis in 1890; while the City of Glasgow Bank failure was responsible for a similar rate in 1878. One of the many causes producing the present state of the Money Market is the fact that revival of trade began abroad before it became marked in England, with the result that a large amount of English capital has

been invested in foreign enterprises the last two or three years. Another cause is, of course, the stoppage of the Transvaal output of gold. Indeed, until the war is over, and peaceful conditions again prevail in South Africa, we must look forward to, and expect to suffer from, a continuance of dear money.

Mr. Chamberlain on the Workmen's Compensation Act.

MR. CHAMBERLAIN has been speaking at Leicester during the past week; and in the course of several addresses he travelled over a great deal of political ground. Among other topics dealt with, was that of the Workmen's Compensation Act, which the speaker described as a measure of reform that "settled once for all, and placed upon a "proper basis, the principle of compensation for work-"men injured in the course of their employment." Mr. Chamberlain admitted that the measure brought with it some unpopularity at first, but stated his belief that the whole country is coming round to see in it the right thing. The principle, restated, is that every business shall bear the cost of the services it exacts, just as the Army provides for its own losses. This is the principle, said Mr. Chamberlain, upon which future legislation will proceed. He referred to the exorbitant demands originally made by Insurance Companies for bearing the risk; and it must be allowed by fair-minded men that the Government had a just grievance against these societies for frightening some of their most loyal followers in this way. However, Mr. Chamberlain, being on the laughing side, contented himself with effectively contrasting the original demands of the Companies with the rates they are glad enough to accept to-day. It is impossible to regard the action of the Insurance Companies in this respect as creditable to their sagacity. They have suffered for their folly, naturally, as new Companies previously in only a small way of business jumped at the opportunity afforded of cutting in, and now hold up their heads with the best. Before quitting this subject, Mr. Chamberlain expressed his personal belief that the time is shortly coming when the Act will be applied to all other trades. This is no more than anybody expects. At present, the protected workpeople are engaged in some of the most hazardous occupations of the whole industry of the country. Yet experience is showing that the cost of compensation is scarcely worth talking about as an element of working charges. Manufacturers can compound for it at rates which are already very low, and are more likely to go down than to rise. Whenever the time comes for all recipients of wages to be covered, the proportional rate will be considerably reduced. At the same time, the amount of litigation under the Act, which is mostly upon boundary disputes, will necessarily be reduced almost to vanishing-point.

WATER AND SANITARY AFFAIRS.

IN another part of the "JOURNAL," an indication is given of the nature of the applications which will be made to the Board of Trade next session for Provisional Orders under the Gas and Water Works Facilities Act, 1870, in connection with gas and water supply; but it is only necessary to notice briefly here those which relate to the latter industry. The list contains nine instances, as compared with seven last year, of the desire of parties to avail themselves of the convenient method of obtaining legislative sanction for new undertakings, or additional powers in regard to those now established, presented by the above-named Act; but, as will be seen, the authority sought is, in the majority of instances, only for raising additional capital. This may be taken as an indication of increased business. Two applications, however—both coming from Kent—are in respect of new works. Some enterprising people are bringing forward a scheme for providing Lyminge and certain other places in the portion of Kent known as the Elham Valley with a supply of water; but they will be willing to transfer their undertaking to any public body, company, or person, on terms. The Tonbridge Water Company—already well established—are desirous of extending their limits of supply so as to include certain parts of Leigh and Shipbourne, as well as Penshurst, and to enlarge their works in order that they may be equal to the extra demands upon them. One can scarcely suppose that these projects will encounter opposition. Village water supply is not always above suspicion, as the Special Commissioner of the "Daily "News" recently showed in the lurid pictures he presented of the condition of things in East Anglia, upon which we commented in the "JOURNAL" for the 14th ult.; and therefore it may be hoped that the residents in the Elham Valley will appreciate at their right value the efforts of those who are about to embark in an undertaking which would make for improvement in the sanitary condition of the district. In the case of Tonbridge, the parishes proposed to be included within the Company's area will probably not object to a more ample supply of good water.

The final stage in an important litigation was reached last Thursday, when the House of Lords upheld decisions of the Court of Appeal and a Divisional Court to the effect that water reservoirs must continue to be regarded as "land covered with water," and consequently, under the provisions of the Public Health Act, 1875, be rated at only one-fourth of the net annual value. The litigants were the Hampton Urban District Council and the Southwark and Vauxhall Water Company; and although the amount actually in question was small, the principle involved was quite the contrary. The facts of the case will probably be in the recollection of our readers; but they will be found briefly stated in the report which appears in our "Legal Intelligence." The Justices who had the matter before them in the first instance—taking, as they said, a "common-sense view" of the point in dispute—decided in favour of the District Council; but they granted a case for a Divisional Court. It was heard by Justices Wright and Darling, who reversed the Magistrates' "common-sense" decision on the strength of previous cases, which could not, they said, be distinguished without casuistry from the one before them. They accordingly gave judgment in favour of the Company, but granted leave to appeal. In the Higher Court, Lords Justices A. L. Smith, Rigby, and Collins upheld the decision of the Divisional Court. The first-named learned Judge pointed out that there had been three decisions as to what was meant by "land covered with water" before the Act of 1875 was passed; and therefore it must be assumed that the Legislature intended the same meaning to be attached to them in that Act. Lords Justices Rigby and Collins concurred; the latter adding that not only did he agree with following previous decisions, but did not see how any other conclusion could have been come to under the plain terms of the Act of Parliament. Notwithstanding these two very definite pronouncements, the Council decided to go to the House of Lords, with the result already mentioned. The leading Counsel for the appellants was Sir Edward Clarke, upon whose advice, doubtless, the case was taken to the highest tribunal; while the Company were represented by Mr. Cripps, Q.C., who was not called upon. One of the cases cited was that of *Regina v. Birmingham Water-Works Company*, tried by Lord Chief Justice Cockburn in 1861, in which a similar point was raised, and settled in the same way as the one under notice. Mr. Lush, who appeared for the Birmingham Corporation in support of the full rating, contended that the words in question referred to "natural water," and that if they had been intended to mean artificial construction, this would have been made clearer and more definite. His Lordship replied that an address to a Committee of the House of Commons might possibly elicit the reason why reservoirs should, in their opinion, be exempted from the payment of the full amount of rates; but the language of the clause was so clear that the Court could not but say that a reservoir was "land covered with water."

With the exception of the first brush with the enemy, the Hampton District Council have been fighting a losing battle all along the line; but they must be thanked for eliciting three very distinct pronouncements by the Courts upon the meaning of words which might, and probably would, have given rise to litigation in other quarters. We fail to see, in view of decided cases, how any different decision could have been given. The Judges have interpreted the law as it has been laid down in the Public Health Act, 1875; the Lord Chancellor having expressed surprise at certain doubts which arose on the point at issue in the minds of the learned Judges in the Divisional Court. Curiously enough, the "one-fourth" rule does not appear to be applicable to reservoirs rated under the Metropolis Management Act. There consequently seems to be some conflict upon this matter which calls for removal. But whether or not the Council will take any steps in the direction of obtaining an amendment of the law remains to be seen.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1387.)

LAST week will be memorable for its one dominant factor, the advance of the Bank of England rate of discount to 6 per cent. It had been generally hoped and expected that the 5 per cent. rate might prove to be sufficient. But circumstances were too strong; and the Directors found themselves, howsoever reluctantly, compelled to raise it. The last time we had a 6 per cent. rate was in 1890, when the Baring failure produced a financial crisis, which reads almost like ancient history—at least, at the rate the world moves nowadays. Business on the Stock Exchange has, of course, felt the effect of it; and prices all round are reduced. The volume of transactions, too, has naturally been kept down to small proportions in most departments; but there was a heavy account in South Africans—the French selling freely, while London steadily took all that they offered. Business in the Gas Market was not particularly brisk; and it seemed to feel the prevailing influence as much as any other department. In the earlier days of the week, transactions were very torpid; but later on there was some revival, though it was mostly confined to the leading issue. Changes in quotation were not numerous; but they were all in the downward direction, as was inevitable. In Gaslight issues, the ordinary opened at about middle figures, and hung on to them for some time, but rather listlessly. On Friday, however, it had to give way a point, and once touched 104½. However, the figures shown on Saturday's transactions were somewhat better. The secured issues were steady and unchanged; the debenture stock being about the firmest. South Metropolitan had only one transaction the whole week, and the quotation was lowered. Commercials also showed only a single deal; but there was no change in quotations. The entire list of Suburban and Provincial undertakings could only muster a couple of transactions; but quotations were reduced for Brightons and for Newcastle. The Continental Companies were as firm as any; but only Imperial came in for notice. None of the undertakings in the remoter world presented any feature. The Water Companies were not absolutely stagnant, though business was quiet, and devoid of interest. Prices ruled a little easier; and one or two slight reductions in quotation were made in response to the pressure of dearer money.

The daily operations were: Gas opened quiet and unchanged on Monday. Prices, where any were made, ruled steady. But Brighton original fell 5. In Water, Southwark fell 2, and East London 1. On Tuesday, there was very little doing in Gas; and prices were only moderate. Brighton "A" was 2 lower. Wednesday's price was rather better; and quotations did not change, but business was much restricted. On Thursday there was a fall of 1½ in South Metropolitan, and 5 in Newcastle; but actual transactions showed steady figures. Friday was the busiest day, but weaker. Gaslight ordinary fell 1. Saturday was steady; and quotations closed without further change.

ELECTRIC LIGHTING MEMORANDA.

Parliamentary Notices—Electrical Traction Schemes—The Question of Efficiency—Information Wanted.

IT has come to be generally understood that, notwithstanding the imputed backwardness of the United Kingdom in submitting historic and handsome thoroughfares to the domination of the trolley wire, there is actually far more money sunk in British electric traction than in British electric lighting; and the difference is likely to very rapidly increase, judging from the nature of the new Parliamentary Notices. There is a fair crop of electric lighting notices; but most of them are of small account, and many are never likely to take practical development. On the other hand, in the class of tramway, railway, and light-railway electric-traction schemes, the total capital involved is very great; and the majority of the present notices evidently mean business. It looks as if every manufacturing, mining, and important commercial centre were to be covered by a project of the kind. Notice has been duly given of a handful of electricity-generation-in-bulk schemes; but it remains to be seen whether these are meritorious and seriously intended. On the whole, the progress of electrical industry, as indicated by the Parliamentary Notices for the year, justifies the expectation of the course of this development which we formed and expressed many years ago. There is a good deal of human nature even in the editorial breast; and the satisfaction of saying "I told you so!" is hard to forego when so clearly deserved as it is in this connection. At a time when our good friends the electricians were trumpeting their intention to put out the gas all over the country, we ventured in this column to suggest that it would pay them better to turn their attention to the far larger field offered by transport undertakings; and this is precisely how affairs have shaped themselves.

We have pleasure in commending to the notice of all those who may be interested in the subject the tabular list of electric tramways and railways in the United Kingdom, issued with the current number of the "Electrical Review." This sheet gives a striking picture of the gathering force of the engineering movement in this direction, and also shows by what various means the desired result is being worked for. One cannot help being struck with the difference between the British and the American ways of tackling the business of electric tramway construction and working, indirectly exhibited by this informing chart. It does not, of course, show any American example; but everybody is acquainted with the wholesale way in which United States cities have been seized and exploited by the great street railway interests. The country has been overrun by them. The mechanical solution of the local problems has all been of one type and origin, which may or may not be the best possible. It was idle for any electrical adviser of an American municipal corporation—if such a person existed—to think out a way of doing the local tramway service. The big street railway trust simply came along, got hold of the "control" somehow, and planked down their own system. Whether for good or for evil, this is not the British way. There are as many busy brains at work upon the electric traction problem in this country as there are tramway and railway undertakings to be equipped, and more; and there is some force in the old-fashioned view that this is the way to get the best evolution in the long run.

It is interesting to watch the displacement of the interest of electrical experts from the lighting branch to that of traction. They have already come to look upon the former as a "side show." Mr. Philip Dawson, writing in the "Electrical Review," a fortnight ago, almost contemptuously dismissed the idea of grafting an electric traction business upon a lighting plant. "Plants originally designed and well adapted for lighting are more than useless; and the combination of a traction station with such is fatal. On the other hand, combining lighting with a traction station may, in many instances, prove exceedingly useful." This is as much as to say that the greater may contain the less; but that the contrary is impossible. Electric tramway or railway traction means the laying down of very much more powerful generating plant than anything required for electric lighting, except in a few of the biggest undertakings. The curious thing is that there should still be so much mystery about the mechanical efficiency of electric tramway and railway working. The commercial efficiency realized is fairly satisfactory in some cases where the traffic is sufficiently busy. Leeds, for instance, appears to be doing well—the working expenses being 39 per cent. of the receipts; but this is an exceptional figure. There is no connection between commercial and mechanical efficiency, and perhaps the electricians are wise in saying nothing about the latter aspect of electrical traction.

There must be some meaning, however, in the rate of fuel consumption to work done in hauling by mechanical means. We are not electrical experts, and are confessedly ignorant of much that electricians may be supposed to know; but we certainly wonder they are so incommunicative on the point of the comparison between the steam railway locomotive and electric railway working. It seems to be taken for granted that electric traction, acting by the overhead trolley wire, can economically supersede horse traction. To do this, a certain minimum of traffic density must be presumed. The comparison must turn upon the amount of business, and some other considerations. In the case of railway working, to which the eyes of electricians fondly turn, the steam locomotive appears to be a hard nut for them to crack. Originally, of course, railways were worked by stationary engines, and their working capacity was only profitably developed when the steam locomotive was brought to its present state of perfection, which, by the way, was a long time ago. It seems to be almost overlooked by many who take an interest in this question, that the electricians are asking the mechanical world to turn back to the older principle of working. This will only be economically possible if their way of generating and applying the necessary motive power is not only better and cheaper than the old cable haulage, but is really and markedly superior to the steam locomotive. Which is to be demonstrated.

A SURVEYOR'S VIEW OF ARBITRATIONS.

AT the first ordinary general meeting for the present session of the Surveyors' Institute, the President, Mr. T. M. Rickman, delivered a powerful address on manifold topics of high professional interest and much public importance. Opening his subject with a brief examination of the scope of the name "Surveyor," which is applied to men of so many seemingly diverse occupations, Mr. Rickman showed that the one link which binds surveyors into a "Unity" is to be found in the word "property." All surveyors, of whatever variety, are custodians, or valuers, or managers of property. They are the men of business upon whom property owners must rely for guidance in "the management and development of property and its most perfect form of utilization under the particular time and circumstances of the case." Originally, surveyors had to acquire their business knowledge as they practised. As time passed, men of experience recorded their knowledge in text books; and a body of accepted practice was gradually formed which can be taught, like law, medicine, or engineering, to beginners. As a professional man, however, Mr. Rickman was careful to point out that knowledge is not everything

in a professional career. When a student has once learnt all that he can glean from books and from observation, his after-success will depend chiefly on qualities of character which no system of education can confer upon him.

Now that the entrance to most professions is guarded by some sort of examination, it is very necessary for it to be clearly understood what the value and office of such an examination is. Mr. Rickman takes the good old-fashioned view that properly devised examinations are of the greatest utility in systematizing a young man's knowledge. A good examination should show what the examinee really knows, and also indicate what he does not know. It should check smattering and disconcert superficiality. Unfortunately, most examinations rather tend to encourage superficiality of the kind that runs to the naming and use of tools, and does not go down to the use of them. After all, and under the most favourable conditions, examinations are but a rough sifting process. The most valuable acquirements of men of all professions come to them, if at all, long after their technical studies are past and over.

This is only saying that a man who has in him, and preserves, the power of observing and the capacity for learning must become a more knowing man; and if he can apply his knowledge, he will be an abler man than anyone in whom these gifts are deficient. A leading surgeon of our day has remarked that "the world is full of learned asses;" and Mr. Rickman declares that "the world is full of folk that look without seeing." It is also crowded with people whose power of assimilating new ideas, in whatever degree it once existed, has atrophied. We have all heard of the man who prayed for his memory to be kept green. All professional men need also to pray for an open mind to the end of their career. Such prayer is more than likely to ensure its own fulfilment.

All the foregoing is general. The first particular matter to which the President of the Surveyors descended, brought him into close fellowship with the civil engineering profession. He spoke of "arbitrations." There he occupied ground common to men of affairs of many different kinds. It is a tremendous subject, as everybody who has ever had, or hopes or fears to have, to do with arbitrations of the kind in question knows full well. Mr. Rickman regards the subject from the standpoint of a competent critic, who is seldom called upon to take part in the performance. He says that his duties only occasionally lead him to the witness-box or the seat of the arbitrator; but he has seen enough of both to assure him that "our present procedure for arriving at the value of expropriated property stands much in need of reform." It is a declaration that ought to be made to reverberate through every local council chamber and board room in the land. What reader of the "JOURNAL" does not know of perfectly scandalous gas arbitrations, which have run into shameful expense, not because they were badly conducted—quite the contrary? Not to cite ancient or modern instances, it may at least be said that it is high time for putting a stop to this legalized and customary spoliation of the public. People wax indignant about the costliness of litigation; but the procedure of the High Courts is economical of time and money in comparison with the ordinary course of arbitrations under the Lands Clauses Act. Mr. Rickman is quite candid about it. He would begin by placing the professional witness upon a different footing. His predecessor in office favoured abolishing the oath in the case of witnesses to matters of opinion and judgment. Mr. Rickman agrees with this reform; but he would go further. Not only would he abolish the oath and frankly accord the professional witness the position of an advocate for his side, as he really is, but he would "put a limitation on the practice of cross-examination." He characterizes this part of the privileges of Counsel as being "rather an exercise in forensic dexterity than a means of assisting the man who has to decide the issue." What heresy!

Mr. Rickman is ruthless on this point. He avers that, "To a well informed and competent arbitrator, cross-examination is a mere weariness to the flesh—a tiresome display of superfluous dialectics. He is perfectly able (or should be so, if he has been wisely chosen) to assess the weight and importance of the evidence in chief; and if he be not, he is by no means assisted by a wordy war between the witness and his cross-examiner. I would therefore give the arbitrator absolute power to dispense with the cross-examination of any particular witness, if he be satisfied that his evidence in chief is honest and relevant to the facts, or to comment freely on such evidence if it has made the contrary impression on his mind." This strong condemnation of a common practice should open the way to a discussion of the whole subject of arbitrations and their conduct, which might prelude a highly desirable reform.

It is pretty clear, however, that reform, when once begun, is not likely to be limited to Counsel's part in arbitration proceedings. It is for parties who contemplate an arbitration—to the extent of making provision for it in an Act—to weigh well the meaning of the apparently harmless words "in case of difference to be determined by arbitration in the manner provided," &c. The circumstance that the same parties rarely go through this expensive business twice prevents their profiting by experience; and others do not seem to learn by example. Where very important properties, running into hundreds of thousands of pounds, are involved, a full-dress arbitration, sustained by "all the strength of the company" is quite right and proper. A few thousands spent in costs is no great matter then. In most plain, straightforward cases, however, where the amount of capital at stake is but small, the cost of a regular arbitration may easily be out of all reasonable proportion to the value of the whole property. Of course, in cases where there is downright animosity between the parties, proceeding from a sense of high-handedness or dread of injustice on either side—perhaps only from personal considerations—there is no help for it. Even so, the original and private professional advisers of the parties ought to explain fully what the arbitration will probably mean, not only to them, but eventually to the public also. This is a free country; and a man has a perfect right to waste his own substance, if he chooses, and reduce his children to beggary by going to law about a trespass by his neighbour's pig. Public men have no such right to pledge the ratepayers to a generation of dear gas, may be, through persistence in a line of conduct of which the strict legality does not palliate the inequity.

The professional men engaged in these extravagant arbitrations, whether their robes be long or short, are not responsible for the waste. It is wholly the fault, or the misfortune, of the parties. Counsel unquestionably take more ells than they are given inches for talking, when the presiding officer is not a Judge. Most of the expense of this method of arriving at the value of a property could be saved if the parties were only reasonable. Other kinds of property, in which men's livelihood is involved—farms, inns, businesses of all sorts—change hands daily on the faith of one or a pair of valuers; and nobody complains. Gas and water undertakings constitute fair game for making up into heavy bags of costs. Thus Westminster and the Inns of Court flourish, while the public suffer.

Reverting to the remaining portion of Mr. Rickman's address, it is only fair to him to mention that he discoursed informingly upon many matters connected with building, and labour questions. We have left ourselves no space for considering these portions of the address in a becoming fashion, and shall therefore defer discussion upon them to another opportunity. The importance of the topic of arbitrations, and the crying need for reform of the conduct of these investigations, must be the excuse for having concentrated the attention of our readers upon this subject. We felt that Mr. Rickman's protest was opportune, especially in view of the circumstance that another year's crop of gas arbitrations is actually in preparation, according to the parliamentary notices. What is done is past mending; but there is really no reason why the hoary old convention of arbitrations should be perpetuated, if only those most concerned would take thought of, and warning from, the records of the past.

GAS AND THE WORKING CLASSES.

IN the course of an essay on "Smoke Prevention and the Popularity of Gas," which appeared in last week's "JOURNAL," attention was drawn to the close connection existing between many of the non-commercial problems which await treatment, and possibly solution, by Local Authorities. The problem of the better housing and lodging of the poorer classes of townspeople, for instance, is connected with many others, and not least intimately with the popularized gas supply of which the beginnings are already with us. It is taking a long time, and the process is attended with much creaking of administrative machinery, to establish coin-meter and assisted gas supplies generally, as an integral part of the business of a gas undertaking. Thus, at the last meeting of the Southern District Association of Gas Managers, there was much discussion of the commercial advantages derivable from coin-meter consumers; the argument turning upon the point of the surcharge which is in most cases made to cover the additional cost to the suppliers of providing the necessary facilities. In only one locality represented in this discussion, we believe, was the broad policy avowedly followed of making no surcharge to prepayment consumers. It is not a very hazardous prophecy to predict that this policy is likely to come into increasing favour, as the administrators of gas undertakings realize the impossibility, as well as perceive the unfairness, of attempting to adjust the prices charged to different classes of consumers, or to individual consumers, by any rule of what does or what does not pay in particular cases.

It has always been one of the afflictions of the poor purchaser to be charged at the chandler's-shop rate for everything, because his circumstances prevent him from buying in any but the smallest quantities. Thus the poor man has suffered twice over for his poverty—the little that he could spend going nothing like so far in its degree as the larger outlay of the well-to-do citizen. The pennyworths of coal and oil have been so dear! In their retail coke trade, gas companies have always acted differently from the chandler and hawker. All purchasers who went to the gas-works could get a single sack at the ton rate. So far as the retailing of coke is concerned, the gas-works has ever been a fair dealer by the poor; and it seems a pity that the pedantry of accountancy should make it otherwise in regard to gas.

This consideration does not apply to the charge, whatever it is, for fittings. It must have struck many, however, that this charge ought to come upon the landlord, not on the poor tenant. In this connection, the question arises of who is to provide the interior piping in new cottage property. The question is even more serious than this, inasmuch as it may not improbably

extend to the fitting of new house property of a better class, hitherto piped for gas as a matter of course by the builder. Where electric lighting is to be had, the temptation will be to wire smart new "Villa residences" instead of piping them; the owners naturally objecting to do both. Hence, unless they look to it, gas companies may find their accustomed source of extended consumption checked. This consideration throws us back upon the case of cottage property. It would be a hardship if the readiness of gas companies to pipe and fit such dwellings were to be interpreted by the landlords as absolving them from the obligation to do in this respect even so much as they have already learnt to do.

Business motives, therefore, unite with, and reinforce, the inducement proceeding from politic considerations for administrators of gas undertakings to take an intelligent interest in the developments of the great problem of housing the poor. Habitual readers of the "JOURNAL" well know that, in discussing many of the social and industrial difficulties of the times, it is never the heroic remedy, much fancied by politicians of the "cock-sure" brand, that is commended in these pages. Whether the need be old-age pensions, workmen's compensation for accident, or anything else of the kind, our bent is usually—but without prejudice—in the direction of first-hand experiment. It is, in brief, the old moral of trying how far the village may be kept clean by every householder undertaking to sweep his own doorstep. Thus we have argued that the gas industry should do as much as possible for its own followers, in every grade. Not to go into generalities, this housing question is open to attack both in the particular respect of making provision for gas workers, and also in the larger way of letting gas have fair play and a good field for helping in the improvement of the homes of the people.

Many gas companies have powers to provide dwellings for their employees. Some possess facilities and scope for exercising these powers. In numerous instances, also, gas companies have procured legislative sanction for obtaining land for works extensions, subject to the now familiar regulation applying to the forcible displacement of members of the working classes. If these various enactments are not all dead letters, they place gas-works administrators in the forefront of those employers of labour who are specially charged and entrusted with the duty of dealing with the housing question on their own account. When they have done this, they ought to be in a favourable position for assisting the local authorities to work out the still bigger problem. It has hitherto been the practice to limit the housing accommodation at gas-works to the manager, or perhaps also a foreman. With exception for special cases, modern ideas do not favour the confinement of the manager to a house on the works. There are gas-works and gas-works, of course; and some are fairly well situated. As a class, however, gas factories are not places where professional men would elect to live and bring up a family. Besides, there are other reasons, which need not be gone into here, for putting a manager's connection with the works on a distinctively business footing.

Whether it is expedient to erect living accommodation for gas workers at, or adjacent to, the factory itself, is a question for investigation with regard to the particulars of every case. No general rule is apparent. At the same time, it may be open to discussion whether the usual practice of asking no questions as to how or where men live, so long as they turn up to their job, is a worthy view of the employers' responsibility. A good deal has been changed since the Workmen's Compensation Act brought the employer into legal relations with his workpeople's "dependents." The need of the age seems to lie in the discovery of some middle course between grandmotherliness and utter neglect, on the part of the employer, of how his workmen live. But then, the history of all progress is that of a search for workable compromises between what ought to be and what can be done.

Whether or not they can see their way to the establishment of settlements of their own workpeople, in their capacity of employers of labour, the administrators of the gas undertakings of great towns are certain to be approached for help and counsel by those ardent philanthropists who are even now dreaming of "Garden Cities" and less ambitious solutions of the housing problem presented by the crowding of the population into the towns. What we are mainly solicitous for is that no narrow conceptions of what does or does not immediately pay shall be permitted to stand in the way of the fullest development of the capabilities of gas in such a connection. Not that there need be any undue coddling, or cooking of accounts, to square "enterprise" with solvency. That may be left to the electricity department. It is nevertheless odd that, while local authorities owning electric lighting departments seem ready to do anything in or out of reason to place electric lighting at the command of the populace, municipal gas departments are never the leaders in the cause of gas popularization.

There appears to be, in the case of London, a growing feeling that the cure for overcrowding will have to be sought in a system of suburban plantations. The force of the Peabody movement is spent. "Slums" are too valuable, as values are computed, to be cleared on a large scale and the sites rebuilt for respectable occupants. The suggestion is that whole settlements should be made outside the populous area, with which they would be placed in communication by fast-running tramways. No deliberate creation of the kind has ever yet been attempted. Can such a solution of the problem be found? It is hard to say. If our blatant Socialists were worth anything at all in the scheme of things, they might turn their attention to a practical topic such as this, instead of vapouring about land nationalization, and such matters, which are about as realizable as schemes for the colonization of Mars. It is at least certain that a good-sized gas-main would have to be laid with the tramway track to any working-class settlement that should have a valid claim to afford all the necessaries of respectable home life at moderate cost. Whether the coin meter would enter into the arrangements of the settlement, might be regarded as questionable. There is something in the view that it is at best a makeshift for reducing the conventional distance between the gas office and the customer.

SHAREHOLDERS AND AUDITORS.

IN their issue of the 18th ult., "The Accountant" continue their friendly discussion of the position taken up by the "JOURNAL" in regard to the duties and responsibilities of auditors. In a previous article, we expressed our willingness to believe, on the authority of our contemporary, that an efficient system of audit is adopted by "first-class firms of accountants;" but we asked how the public were to know which were the "first-class firms," seeing that, as we contended, the fact that a candidate for an auditorship is a Chartered Accountant is not a sufficient guarantee of his fitness for the appointment. Our contemporary admits this contention, and tells us that the professional reputation of an Accountant is the only guide to his fitness—adding, what we can readily believe, that the magnitude of the business done by a firm of Accountants is not necessarily indicative of high reputation. It is, we should say, not infrequently the reverse; more work being undertaken than can be done properly and carefully, and the bulk of it being left in the hands of irresponsible clerks, many of them none too well paid. Our contemporary urges that, as in every other profession members obtain their reputation by their work, so in the profession of auditing reputation serves to distinguish the good from the indifferent. But we do not think that the parallel is by any means exact; for auditing differs radically from the other professions, in that the value of the work done is not readily estimated. An auditor's work, unlike an architect's, is not necessarily productive of tangible results. If the books of a company be correctly and honestly kept, how is it possible for the outside public to tell whether the auditor of that company does his work in such a way that he would discover fraud, were it ever attempted? Further, if fraud were perpetrated in the accounts of a company for twenty years without the auditor detecting it, might not that auditor enjoy an excellent reputation throughout the time? It is, therefore, all the more necessary that negligent auditors should, when discovered, be severely criticized, and, we contend, much more sternly dealt with by the Institute than they are at present. Unless the Institute are prepared to take the necessary steps to make membership thereof a better guarantee of efficiency than it is at present, the value placed upon a Chartered Accountant's certificate by the business community will remain a low one. One step that we think might well be taken would be to prescribe in general terms the form of certificate that an auditor should attach to a balance-sheet, to require every member of the Institute to forward thereto a copy of every published balance-sheet bearing his signature, and to refuse to retain as member any auditor using an unsatisfactory form of certificate.

It remains then, at present, for shareholders to judge of the fitness of a candidate for the post of auditor by his reputation, not merely as an auditor—that may be, and probably is in most cases, a matter of luck—but as a business man; and they will therefore be best advised to select a man of good standing in the industry in which the company is engaged, preferably the accountant of another company. In connection with this question of appointing auditors, our contemporary very pertinently inquires whether the idea that—inasmuch as they are the employers of auditors—it is primarily the business of shareholders to satisfy themselves as to their auditors' qualifications, has ever occurred to a single shareholder when voting for the appointment of an auditor. It is unfortunately the case that little, if any, attention is ever paid to the election of the auditors of a company. This is, perhaps, partly due to the scepticism of the business world as to whether auditors are of much use; but it is also largely owing to the apathy of shareholders to everything but the dividend. We shall not cease to urge upon them the importance of selecting able men for the post, and, further, of keeping them after their election alive to their responsibilities. We have quite recently pointed out the advisability of shareholders from time to time interrogating the auditors at the general meetings of companies, as to the extent and result of their inquiries into the reliability of the accounts they have signed. The difficulty is to find a shareholder sufficiently shrewd and public spirited to raise his voice on this, or on any other, important question at the dreary function known as a general meeting of shareholders. This difficulty is greatest, of course, where the company in question is paying substantial dividends; but it is not a whit the less necessary that the auditors of such a company should be roused to a sense of their responsibilities, because the vital question

which a shareholder should be anxious to have answered, and which the auditor should be (but seldom is) able to satisfy, is whether the distribution of those substantial dividends is justified by the present and future position of the company.

There is one question, to which we have not previously alluded in connection with the duties of an auditor, but to which general reference was made in the "JOURNAL" last week, and as to which shareholders should be especially inquisitive—namely, the provision made in the accounts for depreciation of works and plant. In how many cases do the auditors of gas or electric lighting companies satisfy themselves as to whether the value of the works, land, and plant of the undertakings is maintained at the figure representing the asset in the balance-sheet—that is to say, in most cases, at the actual original cost—or, where the system of replacing or renovating deteriorated works out of revenue is not adopted, whether an adequate amount has been written off for depreciation? If, in the one case, the book value be higher than the true value, or in the other, a sufficient sum has not been written off for depreciation, then—in fact, if not in law—dividends are being paid out of capital. We say "if not in law," because we have in mind, in this connection, the judgment delivered by the Master of the Rolls in the National Bank of Wales case (*ante*, p. 769), in which a distinction—somewhat too fine and subtle for the lay mind—was drawn between dividends paid out of profits augmented by charging bad debts to capital instead of to revenue, and dividends actually paid out of the cash subscribed by shareholders. This distinction, however, is only of practical value to lawyers. If a shareholder's capital is melting away without his knowledge, and each dividend he receives is made up partly of legitimate and partly of imaginary profits, he will care little, when the final crash comes, what name be given to the transaction by which he has been deceived. What he will want to know will be why the auditors whom he appointed to safeguard his interests did not enlighten him as to the true state of affairs. If shareholders would only occasionally remind their auditors of what they are appointed to do, there would probably be fewer occasions for futile abuse of them for having allowed the milk to be spilled.

That shareholders in electric light undertakings are in greater danger of finding they have been living in the particular fools' paradise in which shareholders in a concern with an insufficiently-depreciated capital account spend a more or less brief existence, than are the shareholders in the great majority of gas undertakings, we do not doubt; but, for all that, the necessity for making assurance doubly sure cannot be too strongly urged. In this connection, the fifth and last of the recommendations of the Select Committee on Metropolitan Gas Companies Charges may be recalled: "That an effort should be made by any Company having obsolete or unproductive capital to redeem such capital by sinking fund or otherwise." Is it not the duty of an auditor of a company, part of whose capital is "obsolete or unproductive," to see that, of the amount shown as an asset in the balance-sheet (the net capital expended), the proportion which, as a matter of fact, is non-existent or non-productive is specifically stated in the accounts? In our opinion, if the cost of such valueless plant were not, as we think it should be, transferred from the capital account to a separate "dead capital account"—to which all sums charged against revenue by way of reduction of the dead capital would be carried—then the auditors should qualify their certificate by stating that of the capital raised and expended so much was no longer represented by realizable assets. This would specifically draw the attention of shareholders to the need for redeeming such capital "by sinking fund or otherwise," and, in case some provision for such redemption had been made, would enable them to judge whether such provision were adequate.

The question of whether a company, a certain portion of whose capital has been lost, are justified in paying full, or any, dividends until that lost capital shall have been replaced out of revenue, or written off by reduction of capital, is one on which the law rightly refuses to generalize. It leaves the responsibility for deciding each case upon its merits to those responsible for the direction of the undertaking, who are, or should be, best qualified to judge of the way in which such a loss shall be met. The law will only undertake to punish any directors who have wilfully neglected to adequately provide for redeeming, and who fraudulently conceal from the shareholders, any loss of capital. It is the duty of the auditors, who are appointed to protect the shareholders against such fraudulent misrepresentation of the position of their business, to satisfy themselves that the true state of the capital account is revealed by the balance-sheets, and to report to their constituents if they be not so satisfied. How many auditors of gas companies ever trouble themselves to properly perform this duty, or would be capable of so doing if they tried?

Dealing with the question of what constitutes criminal neglect on the part of an auditor, "The Accountant" says:

> Professional men of all kinds occasionally make an error of judgment; and, as a matter of fact, their reputation will (rightly or wrongly) inevitably suffer in consequence. But we know of no profession, other than accountancy, in which it has ever been seriously suggested that a man should be debarred from attempting to earn his living in that particular capacity for ever afterwards merely because he has once happened to commit this mistake.

If, as would appear, this is intended to refer to any criticism made on any auditor in the "JOURNAL," we have to say that we have never adversely criticized an auditor for committing merely "one" error of judgment. We certainly have attacked, and have attempted to demonstrate the futility of, the system of auditing commonly adopted by shareholders' auditors; and if an entire failure to comprehend the duties and to realize the responsibilities of an auditor be agreed to constitute one error of judgment, we should maintain that such an error should disqualify a professional accountant from practising. But when we have referred to a specific case, it has been to one in which, as we need scarcely remind our contemporary, the auditor had previously had warning of the necessity for adopting a more thorough system, in order to render an audit effective.

With reference to the checking of the valuation of coal stocks, the writer in "The Accountant" says:

> Our contemporary [the "JOURNAL"] then dealt with a supposed conflict of views enunciated by us on the subject of the valuation of stock; but this is quite capable of easy explanation. There are certain tests which an auditor can perform to enable him to satisfy *himself* as to the reasonableness of the valuation placed upon stock-in-trade; and these tests should (so far as they are available) invariably be employed. Certainly one of them would, in the case of a gas company, be to compare the price at which coal in stock was valued with the contract price which had actually been paid for it. Nevertheless, such a test, although useful, is by no means final; and, for that reason, an auditor, while seeking to satisfy himself as far as possible, should, in our opinion, always carefully abstain from attempting to give a definite valuation of assets. To take this particular example alone, it by no means follows that, because coal has been purchased at a certain price per ton, the amount of coal in stock at a particular date is really worth that amount. It would, however, be impossible for a Chartered Accountant, or any other ordinary auditor, to state with any authority what the value of coal in stock might be, other than by testing it with the cost or market price. It would require an expert to say whether or not it was really worth this figure.

We can assure our contemporary that we should be very well satisfied if the auditors of gas companies would occasionally ascertain that the quantity of coal shown in the accounts as in hand was actually in stock on the given date, and was valued at its cost price. Our complaint is that in many cases, if not in most, they do neither.

RECENT PUBLICATIONS.

The Manufacture of Carbons for Electric Lighting and other Purposes. By Francis Jehl. (The Electrician Printing and Publishing Company.)

It is a noteworthy sign of the advance of specialism, that the industry of the manufacture of electric light and electrolytic "carbons" should call for a text-book of its own. Not many years ago the trade in "carbons" was a very small one; and those electricians who wanted pieces of this substance for their own purposes used to beg them from their friends in the gas business, who usually had enough and to spare of this undesirable residual of gas manufacture. Very soon after the demand for "carbons" gave every indication of overtaking this, which may be called the natural source of supply, it was perceived by Carré and others that the market would have to be supplied by a special manufacture of the article. Carré at first relied upon a mixture of powdered coke and lamp-black, made into a paste with syrup of sugar. The mixture was compressed by hydraulic power, and baked at a high temperature. Latterly, the centre of the electric light carbon manufacture has shifted to Germany. The largest factories are at Charlottenburg and Nürnberg. These are the most approved "cored," or hollow carbons. There is a large carbon manufacture in the United States; but these are all solid, and coppered. Nowadays, M. Jehl says, to copper a carbon stamps it as inferior. There is no mystery about the German make of the commodity, the excellence of which is chiefly a question of the baking. The best are compounded of lamp-black mixed with tar. Second quality carbons are made of lamp-black, petroleum coke, or gas-retort carbon, and tar. Common carbons, electrodes, battery plates, and carbon brushes are all made of gas-retort carbon mixed with tar. About 25 to 33 per cent. by weight of tar goes to the mixture, which is squirted out of presses at 350 lbs. or 400 lbs. hydraulic pressure. The carbon is sorted out of the gas graphite—only the hard portions being taken—and broken into suitable pieces in a crusher. The iron particles may be withdrawn by means of a magnetic separator. It is then ground by edge runners, and made plastic with tar, which must not have any water mingled with it. The lighter oils are usually boiled off from the tar, which is thus made "dry." There is a good deal of detail to be attended to in this manufacture, as M. Jehl explains. The most particular feature of the process is the firing, which is always done now by means of a gas-generator furnace. M. Jehl describes gas-generators at considerable length; but, of course, there is nothing new in this part of the book. Still, it is instructive to note the ingenious application of gas heat to the particular purpose in the furnaces of Mendheim and Escherich. This is really the most interesting part of the book, as a contribution to the literature of practical pyrology. A useful chapter is devoted to the commercial production of lamp-black, as to which the author thinks there is still much room for improvement. Most engineers who read the chapter will agree with this opinion. It is rather remarkable that a very modern writer on this subject has suggested that acetylene should be expressly burnt for the production of soot! This is indeed making a virtue out of a necessity. M. Jehl's

work, as already remarked, is of a highly specialized character; but it is full of sound technical teaching, and is in some respects an illustration of the paradox that the best road to general truths is through a collection of particular facts.

A Handy Book on the Formation, Management, and Winding Up of Joint-Stock Companies. Twenty-second Edition. By William Jordan and F. Gore-Browne, M.A. (Jordan and Sons.)

The law relating to joint-stock companies is governed by so many judgments, is so full of knotty points, and is, withal, so important to all concerned in their management, that we are not surprised that Messrs. Jordan and Browne's comprehensive, and yet not unwieldy, manual is in constant demand. That it should have already reached its twenty-second edition, is of itself sufficient proof that the pudding is approved after its eating. The book, which is throughout clear and concise, deals with the requirements imposed upon a joint-stock company—incorporated under the Companies Acts 1862 to 1898, more familiarly known as the Limited Liability Acts—from the registration of its Memorandum of Association to its winding up and dissolution. The exhaustive character of the work (and the intricacy of the law) may be gathered from the fact that close upon a thousand cases are cited, of which about a score directly refer to gas or water undertakings. The present edition contains, among other fresh matter, the clauses of the Finance Act, 1899, affecting the stamp duties payable on the registration of companies or on an increase of capital; the text of the Companies Act, 1898, relating to the sufficiency of filed contracts; and the more important of the decisions in Case Law during the eighteen months ended August this year.

The Secretary's Manual on the Law and Practice of Joint-Stock Companies. Sixth Edition. By James Fitzpatrick and V. de S. Fowke. (Jordan and Sons.)

This book forms a companion volume to Messrs. Jordan and Browne's "Handy Book on Joint-Stock Companies;" and both should be on the book-shelf of the chief officials of companies registered under the Limited Liability Acts. The "Secretary's Manual" will, indeed, be found useful by the secretaries, accountants, and registrars of other companies, as a very valuable feature of the book is the provision of a complete set of model forms and books for use in the general business of a company, and especially those required in the work of the stocks and shares department. The present edition contains the recently remodelled rules of the London Stock Exchange relating to the procedure in regard to the settlement or official quotation of the shares or securities of public companies. Both this and the "Handy Book" have full indices and lists of cases cited.

Portland Cement: Its Manufacture, Testing, and Use. By D. B. Butler. (Spons.)

This manual is published with the *imprimatur* of the Portland Cement Testing Works and Laboratory, 41, Old Queen Street, Westminster. It is intended to set forth the facts of the portland cement manufacture in accordance with the most approved modern practice, and also to tell all that is worth knowing about the testing and uses of the commodity. This is an ambitious scheme; for if portland cement is anything at all, it is one of the chief building materials of the age. It is incumbent upon the engineer to know all that is necessary to be known concerning portland cement. Mistakes with portland cement, and with structural steel, have spoilt more engineering reputations than any other class of blunders; and the tale is not completed even yet. Some more harbour walls will dissolve into the sea before all risk of such disaster is eliminated. We commend to particular attention the author's chapter on testing cement for soundness—still an "unknown quantity" in only too many examples. Portland cement is one of the really important conquests of the Victorian age; and it is impossible for too much to be known about its merits and defects. A volume might well be written about the uses of cement in building and engineering construction. The present book merely skims this part of the subject; and, indeed, deals more with the preparation of the article for use than with the uses themselves. Every word of this is golden, so far as it goes. That it does not go very far, however, may be understood from the observation that the use of coke-breeze concrete, or concrete reinforced with metal, is not so much as mentioned.

Raising Water by Air.—At a recent meeting of the Cleveland Institution of Engineers, Mr. C. Wood, of Middlesbrough, read a paper on "Raising or Lifting Water by Air." The system comes from the United States, and is the invention of Dr. Pohle. It consists of two plain open-ended pipes, which are let down into the well. The larger of the two has an expanded end at the bottom, and is the discharge-pipe; while the smaller, which leads into this enlarged end, constitutes the air-pipe through which the compressed air is conveyed. These pipes are all put together on the surface of the ground, and lowered to the bottom of the well. There is consequently no obstacle to the free movement of the water; and the full area of the discharge-pipe becomes accessible for the first time in the history of deep-well pumping, and moreover, all valves, buckets, plungers, rods, or other moving parts within the well or pipes, are dispensed with. Mr. Wood stated that a discharge-pipe 30 inches in diameter would deliver a million gallons per hour.

OBITUARY.

The recent death is announced of Mr. JOSEPHUS WARD, who for 35 years was Manager of the Brierley Hill Gas-Works. Deceased was in his 63rd year.

The death occurred suddenly last Saturday of Mr. JOHN HENNINGS NIX, of Crawley, one of the Directors of the East London Water Company. Deceased was in his 70th year.

We announce with regret the death of Mr. JOHN THOMAS, Secretary of the Plymouth and Stonehouse Gas Company. He had been in indifferent health for two or three years; but last week he became worse, and died on Saturday. Mr. Thomas had been connected with the Company for a very long time, and for about twenty years had held the office of Secretary.

We record with regret the death, on Sunday of last week, of Mr. JOHN LEES, J.P., who was in his seventieth year. He was a founder of the Redhill Gas Company, of which he was one of the first Directors, and succeeded the late Mr. W. B. Waterlow as Chairman, holding the office until within a few weeks of his death. In the affairs of the concern, he took a deep interest; and against unfair rating he always jealously endeavoured to guard the Company.

PERSONAL.

Mr. ROBERT SURTEES, of Lymm, Cheshire, has been appointed Manager of the Fenton Gas-Works, in succession to Mr. F. H. Darwin, who has retired for private reasons. With the change, the duties of Manager and Secretary have been separated.

Mr. J. T. BICKFORD (late of the Brighton Corporation Water-Works) has been appointed Resident Engineer and Secretary of the Newhaven and Seaford Water Company. This change has necessitated the retirement of Mr. ARTHUR C. HILLMAN, who has been Secretary of the Company since its formation in 1881, and who was the first to recognize the importance of having a resident chief official.

Mr. T. RAYNES, Manager of the Johannesburg Water-Works, was one of the few Englishmen who remained in the Transvaal after the general exodus. Writing on the 27th of October to Mrs. Raynes, who was in Cape Town, he said that he and the rest of the officials had been made special constables for the protection of the water-works, and were provided with arms and permits. They were at the water-works all night, in watches of four hours each, to guard them against the Boers.

The Leicester Town Council have, by 34 votes to 18, consented to the appointment of the Town Clerk, Mr. J. BELL, as Clerk and Solicitor to the Derwent Valley Joint Water Board. Mr. Bell has assured the Council that he has not any doubt as to his ability to undertake the work of the Board without in any way interfering with his duties as Town Clerk. He is to receive a salary of £400, and the necessary clerical assistance. This arrangement will lead to the establishment of the offices of the Board in Leicester.

The succession of Dr. T. E. THORPE, F.R.S., Principal Chemist of the Government Laboratories, to the late Sir Edward Frankland, as Water Examiner to the Local Government Board, is referred to by both of our medical contemporaries this week. The "Lancet" questions the wisdom of conferring the appointment on a gentleman whose present duties are well known to be very exacting upon the time and faculties of one person, and expresses the opinion that plurality should have been avoided, especially as each office secures ample remuneration. Dr. Thorpe's splendid work in the direction of chemical research is fully acknowledged; but our contemporary does not remember meeting his name in connection with either the chemistry or the bacteriology of water. We may remark on this point that if Dr. Thorpe adheres to his plan of reporting solely on the chemical and physical condition of the water supplied to the Metropolis, special acquaintance with bacteriology will scarcely be called for. The "British Medical Journal" does not question the appointment, and speaks very appreciatively of Dr. Thorpe's work during the past thirty years.

NOTES.

The Demand for Coke for Locomotive Use.

It is concluded by the "Engineer" that if the London County Council take vigorous action against the Metropolitan and Suburban Railway Companies for suppressing the smoke nuisance perpetrated by locomotives, the consequences on the fuel markets may be serious. It is admitted that the railway companies in question are legally in default; and that the only way of working locomotives smokelessly in towns is by restricting them to smokeless fuel. In the country, on long runs very little smoke need be made with bituminous coal of fair quality, because the furnace of the locomotive can be worked under regular conditions. On the Metropolitan lines, with their heavy loads and steep grades, forced firing and consequent smoke is unavoidable, except with smokeless steam coal or coke. Furnace coke has been unattainable for months past, and will be for months to come. "Even if gas coke could be had, steam

could not be kept with it—it is too poor a fuel." Here is a suggestion on the lines of the gas making at Everett, Boston, U.S.A., recently explained in the "JOURNAL." The question is again raised, as to whether it is possible to improve the quality of gas coke without detrimentally affecting the other results of coal carbonization in gas-retorts.

Borneo and Other New Fuel Oils.

The announcement of the launch of a steel-built tank-steamer, for the Borneo oil trade, to carry a cargo of 8500 tons, is a striking illustration of the widespread development of the trade in petroleum for manufacturing purposes. It has been evident for some time that the old-established sources of petroleum were becoming insufficient to cope with the enormous and growing demand for grades of mineral oil other than kerosene. Consequently, the prices of the commodity, of all the leading brands, have risen. Borneo fuel oil is quite a new competitor for favour, the first sample having been brought over to this country for analysis less than three years ago. Already it has come into extensive use for gas making in England. It is also being pushed as a steamer fuel, especially in the Eastern seas. Besides Borneo, oil is coming into the market from Sumatra; and there is reported to be oil in Cuba. Peru is another source on the seaboard whence a large proportion of the world's oil supply in future may be drawn. On the European Continent, the old Galician and Roumanian fields are being pricked into renewed activity. The American and Russian supply actually commands the market, and will continue to do so for a long time to come. But there will be plenty of healthy competition in the trade when the new sources are fully brought into operation; and the pressure on the best coal will be substantially relieved.

Tar Macadam Roads.

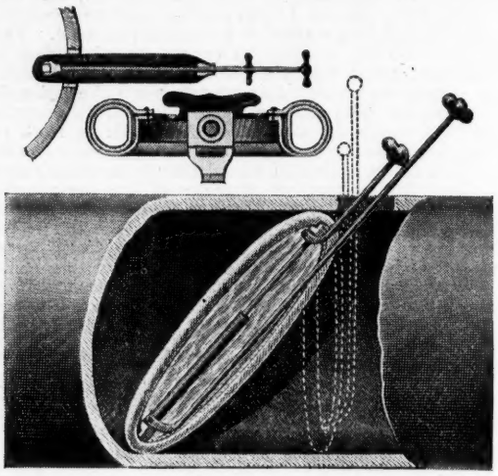
In the course of an instructive series of articles describing road construction, the "Builder" remarks of the newest of road-coatings, tar macadam, that it is found to be very advantageous where the traffic is not too heavy. It is more impermeable and less easily disintegrated into mud or dust than the ordinary macadam, and is practically noiseless. It ought accordingly to be the ideal material of construction for second-class roads in English towns. The stone employed for the purpose must not be too hard, or uneven wear would soon result. Limestone is the best metalling, and may with advantage be mixed with blast-furnace cinders, where this material can be obtained. The stone is broken to a suitable size, as for ordinary macadam roads, and is then heated and mixed while still hot with a mixture of hot pitch and tar, or pitch and creosote. Three parts of pitch to one of tar, or seven of pitch to one of creosote, is indicated. One way is to lay 3 inches of tarred 2½-inch stones on the graded road bottom, well rolling it to the contour. Upon this comes a second layer of 2-inch stone, treated with a more fluid bituminous mixture. Over all is a coating of ¾-inch stone, covered with sharp grit. Another construction is to lay the road coating to the thickness of about 6 inches first, as with ordinary macadam roads. Upon this a boiling mixture of pitch and creosote oil—1 ton of pitch to 50 gallons of creosote oil—is poured and brought to the surface. While this is still warm, a thin layer of stone is spread upon the surface, and the whole is well rolled, with the addition of chippings, until the surface is perfectly smooth and compact. Roads of this kind should be laid in dry weather, and before the heat of the sun becomes excessive. When the surface shows signs of wear, and before the skin completely breaks up, the road should be retopped. In clay soil regions and humid climates, this principle of road making ought to be very successful.

Estimating for Steel Skeleton Building.

It is known that building in steel frames, which carry the brick or stone walls and also form the floors, is a modern American architectural speciality. The Homestead Steel Works of the Carnegie Company have laid themselves out for this branch of trade; and recently the Works Manager, Mr. F. H. Kindl, essayed to instruct the members of the American Institute of Architects in a simple way of estimating for this class of work. Although plans and specifications differ, yet it has been found by experience that the following formula for the weight of the steel skeleton can be used with sufficient accuracy for preliminary estimates: $W = NF(15 + 0{\cdot}7\,N)$; in which W is the weight sought, in pounds, N is the number of floors, including the roof as a floor, and F is the number of square feet in each floor. The first number inside the bracket, multiplied by NF, will give the weight of the beams and fittings required in the floors; while the second number, multiplied by the same factor, gives the weight of the standards. Thus, in a typical steel-skeleton building 15 stories high, with a floor area of 10,000 square feet, there would be 2,400,000 lbs. of beam work, and 1,792,000 lbs. of column or standard work—total, 4,192,000 lbs. of steel work. As for cost, erected, it is stated that the average cost of fitting beams, including the painting, is about ¼d. per pound above the cost of the plain metal; and in the case of columns, ¾d. per pound weight. At the works, the rolled sections are priced at an average of 1d. per pound. To these costs must be added those of carriage and erection. The former can generally be done in the States for 2s. per ton; and the erecting for 27s. per ton. Steel is rising in price; but still the cost of this kind of building framework appears wonderfully cheap. It is stated that steel in bars for building is almost twice the price in Pittsburg that it was a year ago.

The Goodman Gas-Main Stopper.

A welcome addition to the safety equipment of gas-works has been brought under our notice in the speciality, which is illustrated herewith, of the Safety Gas-Main Stopper Company, of New York. As will be seen by the figure, this is intended to be an improvement on the gas-bag. It depends upon the



principle of the pneumatic wheel tyre; and the method of adapting this idea to the stopping of gas-mains is ingeniously simple. A hole being cut in the main, the stopper, pulled into its longest lineal dimension, is introduced in a slanting direction towards the pressure. When in, a half-turn of the handles faces the stopper to the pressure. The next operation is to firmly but carefully pull the stopper into place, as shown, until it binds all round against the inner surface of the pipe, and stops the flow of gas. There is no blowing-up of the apparatus; and its action is positive within the limits of control of the handles. It is claimed that a 24-inch main can be shut off by this means in 30 seconds. The same size tap hole is required as for the ordinary rubber gas-bag; but this stopper is warranted to outlast ten bags. It seems well worth a trial.

Openings for Mechanical Engineers in China.—In the course of a lecture recently delivered by Lord Charles Beresford at the Institution of Mechanical Engineers, he expressed the opinion that, owing to the abundance and cheapness of coal, electrical engineering would in a short time be a very profitable branch of industry in China. In the European settlements electricity is already used for lighting purposes; and even at Hankow, 600 miles up the Yangtse River, electrical plant is being put down. He pointed out that England is far behind Japan and America in the use of electrical power; and he remarked that, unless we are much more energetic, the plant which China will require will come from those countries. At Kioto, in Japan, he saw the great electrical plant which, in addition to lighting two-thirds of the town, also supplied the motive power for the city trams, for the pumping machinery at the water-works, and for no less than sixty different industries in or near Kioto. The plant is chiefly American; but his Lordship says the Japanese are now beginning to make their own.

The Distance at Which Explosions are Heard.—Mr. Charles Davison has furnished some interesting particulars on the above subject in a letter to "Nature." Beginning with the explosion at St. Helens last May, he says it was heard and felt over an area, elliptical in form, 39½ miles from east to west, and 27¼ miles from north to south, or about 850 square miles. Towards the east, the sound was heard at Alderley Edge (24½ miles from St. Helens) and at Oldham (27 miles). Windows were observed to rattle at the first-named place, and also at Marple (28 miles). To the west, the sound was heard at Liverpool (10 miles) and Aughton (10 miles). Mr. Davison tried in vain to ascertain the direction of the wind at the time of the explosion at different places within the sound-area. He compares the foregoing particulars with those of other explosions. On the occasion of the Erith gunpowder explosion in 1864, the sound was heard and felt at Teddington, Uxbridge, and Windsor (21,27, and 32 miles respectively from the scene); while the concussion is reported to have been observed near Ashford, 40 miles distant. The catastrophe on the Regent's Canal, on Oct. 2, 1874, when about five tons of gunpowder exploded, was felt at Chiselhurst, Aveley, and Gravesend—13,18, and 23 miles away; and the explosion of dynamite at Johannesburg, on Feb. 19, 1896, was felt at Pretoria, 33 miles off. It is affirmed that the report of the explosion of the Lagouban naval magazine near Toulon early this year was heard at Nice, which is 84 miles distant, and even at Ventimiglia, 15 miles farther.

TECHNICAL RECORD.

AMERICAN GASLIGHT ASSOCIATION.

The Annual Meeting in New York.

(*Concluded from p.* 1246.)

Dr. Morton was requested to open the discussion on the paper entitled "Another View of Interior Illumination." He said daylight was the best light, and it was a reflected and a diffused light. Irregularities in lighting should be avoided for physiological reasons, which he fully explained. The light produced behind the artificial window might most nearly resemble daylight; but this, and also experiments with diffused or reflected light, required a much larger quantity of light than was provided in the ordinary way, and the failure of such experiments was more apt to be due to insufficient light than to the quality. Translucent diffusers were more economical than indirect reflectors; and the essentials of good lighting were an abundance of illumination approaching as nearly as possible to daylight, and a thorough diffusion or equality of lighting in all parts. Mr. Gifford remarked that, where a single candle was used years ago, nothing less than a 50-candle Welsbach was now thought sufficient. Mr. Wheeler called attention to the enormous loss of light through the use of dull colours for shades, decorations, and walls. Whereas white paper absorbed only 4 per cent. of light, black velvet absorbed 90. There was some danger of over-lighting; and a room over-lighted was probably more objectionable than one not lighted sufficiently.

Mr. Rollin Norris read a paper entitled "Some Experiments with the Edgerton Standard." He remarked on the necessity for accurate, and at the same time fairly rapid, photometrical tests. The jet had certain advantages as a rough-and-ready indicator; but it really did not measure illuminating power at all. A bar photometer was therefore necessary for reliable work. The difficulty with candles was that they varied from moment to moment; and even a ten minutes' test did not always yield satisfactory results. Therefore a great deal of effort had been put forth in the direction of a secondary standard that was free from these defects, and would remain constant and unvariable. The more prominent examples of such standards were the Methven screen, the various forms of pentane lamps, and the Edgerton standard. The last named was largely used in America as a cheap, simple, and reliable standard. It consists of an ordinary 24-hole Sugg "D" argand burner, with 7-inch chimney, surrounded by a blackened brass sleeve, in which is cut a slit $\frac{13}{32}$ inch high, with the lower edge $\frac{7}{8}$ inch above the top of the burner. The theory is that, if the flame is adjusted to a height of 3 inches, the horizontal section visible through the slit will have a practically constant value under all ordinary variations in the quality of gas. The author had conducted a number of experiments with a view of finding out how far this was correct, using for a standard the Harcourt 10-candle pentane lamp as adopted by the London Referees. Using water gas prepared by three different processes, he obtained average values for the Edgerton standard of 6·27, 5·99, and 6·01 candles respectively—a variation of nearly 5 per cent. While the individual tests of the first and third series showed a range of not more than 3 per cent., the second series had a range of 10 per cent. The samples of gas used in this series were of from 19 to 28 candles; but there was no connection observable between the value shown by the standard and the quality of the gas. Experiments with coal gas of ordinary quality gave more satisfactory results; the total range of individual experiments not exceeding 6 per cent., and the averages being 4·44, 4·54, and 4·49 candles. The value indicated by coal gas was only 75 per cent. of that obtained with water gas. No tests were made with mixed gases, as it was considered the above figures showed that they would not be reliable. Tests with various heights of flame indicated that the shorter the flame the greater the value. A $2\frac{1}{2}$-inch flame gave 6·5, a $2\frac{3}{4}$-inch 6·4, a 3-inch 6·3, a $3\frac{1}{4}$-inch 6·2, and a $3\frac{1}{2}$-inch 6·1. This showed that the height of the flame must be very accurately adjusted. A "D M" burner was substituted for the "D," and a large number of tests were made with various qualities of coal gas ranging from 16·8 to 13·4 candles. The value of the standard appeared to approximately follow the quality of gas; and it varied from 3·98 candles with the lowest, to 4·77 candles with the highest. The conclusions arrived at by the author were that if the Edgerton was carefully standarized in the first place, it might be relied upon to give results whose errors should not exceed $1\frac{1}{2}$ candles; while a large majority would be correct within 1 candle. For more accurate work, the Harcourt standard was preferable. He had used three of these pentane lamps for some time, and found them very accurate and reliable. The result of a large number of tests against candles gave it an average value of 10·03. In concluding, the author suggested that this standard should be adopted in America. Discussing the possibilities of improving the Edgerton, he thought the gas supplied to it might with advantage first be freed from carbonic acid.

Mr. Gartley, opening the discussion, enlarged on the importance of a reliable standard method of photometry. Candles were not convenient for frequent tests; and the argand, as used in England, was not suited to the high-power water gas supplied in America. The variations in candles were much greater during warm weather. Mr. Gifford quoted some experiments which showed that, while the outer portions of the flame varied, the middle was fairly constant; and he thought that, if the slit was narrowed so as to cut off the outer edges, better results would be obtained with the Edgerton. Mr. Wheeler spoke highly of the Hefner unit and the form of photometer adopted in Germany, as far superior to candles and the bar photometer. Mr. Miller had used the Edgerton standard for many years, and considered it everything that was necessary for works' use; and its variations were less than 1 per cent. Mr. Graf remarked that the standard for America should be applicable to coal, water, or mixed gas. Mr. Clark contended that the Edgerton was superior to the jet for works' use; though not quite good enough for municipal testing purposes. The subject of a standard unit was referred to the Research Committee.

A paper on the "Consumption of Steam in a Water-Gas Plant" was read by Mr. Alten S. Miller, of New York, who said that, while a great deal had been written on "Purification," the subject of steam consumption had excited but little interest, although it was three to five times as costly. He had made some careful calculations on the actual work done at a certain gas-works. For every 1000 cubic feet of gas made, 67 34 lbs. of water were fed into the boilers, representing over 60 million foot-pounds of energy, of which he could only trace a little over 17 millions, or 28 per cent., as utilized for actual working. Over $16\frac{1}{2}$ millions foot-pounds were used for heating oil and making gas; the remainder being required for the blast and pumping engines. He went on to show that there was not much room for economy with the present plant, which had been put together with a view of utilizing existing apparatus, or as the exigencies of the works demanded, without regard to economy of steam. He argued that, by adopting modern types of machinery, the consumption of steam by the pumping and blast apparatus, at present 32 lbs., could be reduced to 10 lbs. A gas-works of 500,000 cubic feet production per day, or more, should follow modern shop practice, and use all steam within 50 to 75 feet of the boilers.

A paper on "Carburetted Water Gas as a Coal Gas Auxiliary" was read by Mr. A. G. Glasgow; the author stating that the advantages of the "mixed" processes over the single production either of coal or water gas only, were not fully appreciated. The importance of the subject dealt with justified the publication of the paper *in extenso*, with the diagram, in last week's "JOURNAL." In the course of the discussion, Mr. Nettleton, though claiming to be a thorough coal gas man, acknowledged the great help derived in meeting variations of demand and other difficulties, during the heavy season, from an auxiliary water-gas plant. Without it, there must be an excess of retorts, or occasional shortage of supply. Mr. Neal said the advantage of the water-gas auxiliary was that it would take up the variations; allowing the coal gas benches to be run continuously. But water gas had not proved a preventative of naphthalene in his case. Mr. Forstall said that, in comparing the cost of water and coal gas made on the same premises, the enhanced value of the residuals should be credited to the water gas, and not to the coal gas, as was usually done. He was greatly in favour of a mixed plant. Mr. Egner said there would be no naphthalene from water gas if the plant was not overworked.

A question was asked as to the comparative value of cement and lead for jointing main pipes. It was agreed that a slow-setting cement made the soundest joint. One objection to it was that, being rigid, it did not allow of expansion and contraction; so occasionally a pipe was fractured. This did not often happen; and the leak was promptly detected, by reason of its magnitude.

After the usual votes of thanks had been passed, the meeting was brought to a close.

THE GERMAN ACETYLENE ASSOCIATION.

The Annual Meeting at Nuremberg.

(*Continued from p.* 1316.)

Dr. O. Münsterberg, of Berlin, read a paper on "Carbide Manufacture and the Carbide Market," in which he dealt chiefly with the economical aspects of the production and disposal of carbide. He pointed out that there was an ample market for carbide, without affecting the sales of the older illuminating agents. Carbide was not in a position to displace petroleum, because the available sources of water power for its production were quite inadequate to provide more than a fraction of the amount of carbide which would be equivalent to the petroleum at present imported into Germany. In 1896, Germany imported 85,300 (metric) tons of petroleum; and acetylene equal in photogenic value to this quantity of petroleum would require for its production about 680,000 tons of carbide, for the manufacture of which 680,000-horse power must be available continuously throughout the year. The only sources of water power practically available for the supply of carbide in Germany are those of German-Switzerland, Austria, Norway, and Sweden. The only large source of power in Germany is at Rheinfelden, where 23,000 horse power is available, of which 5000 is applied by the Neuhausen Electro-Chemical Works in carbide manufacture. Other works, aggregating 5000-horse power, are being constructed; but as the Prussian Railways have contracted to take 3000 tons

of carbide per annum, the amount available for sale from all the German works cannot exceed 7000 tons a year. In Switzerland, 9000-horse power, and in Norway and Sweden 8000-horse power, are at present available for carbide production, and in the course of the ensuing year, there will be about 8000-horse power similarly applied in Austria. Therefore the available supply of carbide on the European market will be about 32,000 tons when the works now in course of construction are in full operation. For the present winter there will be only about 15,000 to 20,000 tons for disposal. The rapid rise in the price of carbide which was experienced last winter, was due largely to forward sales at low prices on the part of persons who were erecting carbide works, which, for various reasons, failed to yield the anticipated quantities. Carbide had to be obtained elsewhere to fulfil the contracts; and very high prices ruled. In order to extend freely the use of carbide, the price must not be so high as 2¼d. per lb. At a price of 1⅜d. per lb., carbide could compete with petroleum (in Germany); and its use would be enormously extended. The works, however, should be able to supply carbide at a moderate price such as this. For instance, packing and freight charges from Norway to (say) Frankfort-on-the-Oder would amount to about ½d. per lb.; and the cost of manufacture would therefore have to be not more than 1$\frac{1}{10}$d. per lb., in order that the carbide might be sold in Frankfort-on-the-Oder at 1⅜d. per lb. Now there is no question that carbide can be manufactured at a cost of 1$\frac{1}{10}$d. per lb., and so it should be retailed in most towns in Germany at 1⅜d. per lb.

Dr. P. Wolff, of Berlin, next spoke on "Conventions in the Carbide Trade." He thought that carbide should be quoted at prices per unit weight net, and inclusive of packing, in drums of about 2 cwt. capacity. The drums should be of galvanized sheet iron, and air and water tight. The standard commercial quality should yield from (say) 4·5 to 4·8 cubic feet of gas at 59° Fahr. and normal pressure. When the buyer has agreed to take carbide of lower grade, that yielding from 4 to 4·5 cubic feet per pound must be accepted at a correspondingly reduced price. Carbide which yields less than 4 cubic feet per pound need not be accepted. The drums must not contain more than 15 per cent. of dust; and the lumps should range from the size of hazel nuts to that of the fist. The analysis, when necessary, must be carried out by a certified chemist according to the methods adopted by the German Acetylene Association. The gravimetric methods are in common use at carbide works; but they should not be used in general analyses. The samples should be taken on delivery, as the carbide deteriorates on transport. About 50 grammes should suffice for the analysis; but the sample must be taken with every care, to ensure it being representative of the bulk of the delivery.

Herr K. Thurnauer, of Nuremberg, spoke on "Advances in the Construction of Acetylene Burners," and exhibited several patterns made by the firm of J. Stadelmann and Co. He pointed out that it was necessary the orifices of the burners should be kept as cool as possible, in order that they might escape becoming choked by products of polymerization; and to this end the flame should be kept as far as possible from the orifices. The burners exhibited included several varieties of the Dolan and Billwiller types, in which air is admitted through lateral holes into a small chamber above the gas-orifice. The mixture of gas and air issues from an orifice in the top of the chamber, and impinges on the jet from a similar tip set at right angles to the first. A bunsen burner, for heating purposes, the flame of which did not strike-back when the gas pressure exceeded 23-10ths, was shown. It was stated, however, that it was desirable the pressure, both for heating and lighting burners, should be maintained at about 4 inches, which was higher than had been advocated at one time.

Herr J. Knappich, of Augsburg, in a paper on the "Storage and Transport of Carbide," complained of the stringency of the regulations for the conveyance of carbide made by railway authorities and other carriers. The cost of transport was thus rendered unduly high. He said that the general Press was responsible for a large share of the public distrust of carbide, owing to the manner in which fires and explosions due to other causes had been frequently reported as having arisen from carbide; while the mistake had not afterwards been acknowledged with sufficient prominence to counteract the ill-effects of the original reports. He pointed out instances of erroneous Press statements which had greatly injured the carbide industry.

Herr J. Pfleger, of Frankfurt-on-the-Main, described a "New Purifying Agent for Acetylene, known as Puratylene." It consisted chiefly of chloride of lime (bleaching powder), with which caustic lime and calcium chloride had been mixed. It was in the form of lumps, and so could be disposed in deep layers in purifying boxes, whereas most purifying agents already suggested were in powder. The chief advantages claimed for "Puratylene" were its high duty and its freedom from odour and corrosive properties. One pound of "Puratylene" was stated to be capable of completely removing phosphuretted hydrogen, sulphuretted hydrogen, and ammonia from 480 cubic feet of acetylene.

Herr H. Herzfeld, of Augsburg, contributed a paper on "Acetylene Supply Works." He divided these into two classes—the first being supply works for a factory, institution, or other large building; and the second, central works for the supply of numerous consumers in a district. For the lighting of spinning mills, he considered acetylene superior to all other artificial illuminants. The electric arc light was not sufficiently uniform, and it cast sharp shadows; while incandescent electric lamps were practically useless in factories, as were also, in his opinion, incandescent gas-lights. Open-flame gas-burners, which were ordinarily employed for lighting spinning mills, did not furnish adequate illumination. He had calculated the exact cost of lighting a particular factory with 1000 acetylene lights, allowing for 5 per cent. interest on capital, and redemption of capital in 30 years. On the basis of this calculation, he had worked out the price at which coal gas would have to be supplied in order to give the same illumination by means of flat-flame burners at a like cost. The results are as follows:—

Comparative Prices of Acetylene and Coal Gas,

Assuming that 10 candle-hours are obtained from 0·25 cubic foot of acetylene, or 4·06 cubic feet of coal gas.

Carbide, price per pound . .	1·63d.	1·90d.	2·18d.	2·72d.
Cost of acetylene, per 1000 cubic feet	£1 15 5	£2 1 3	£2 7 2	£2 19 0
Cost of 10 candle hours. . .	0·105d.	0·120d.	0·135d.	0·165d.
Corresponding price of coal gas per 1000 cubic feet . . .	2s. 2d.	2s. 5½d.	2s. 9½d.	3s. 4½d.

The computations made showed that, on the foregoing assumptions, coal gas should cost only about 2s. 3d. per 1000 cubic feet in order to compete in flat-flame burners with acetylene obtained from carbide costing, as at present, about 1¾d. per lb. Coal gas was not supplied at so low a price from any gas-works in Germany. Carbide had been sold at less than 1½d. per lb. on extensive contracts; and to compete with it at such a price, coal gas must be obtainable at less than 2s. per 1000 cubic feet. Herr Herzfeld next discussed the second class of acetylene supply works—viz., those intended for the lighting of a district. He presented the appended table of existing acetylene supply works, which, he said, pointed to a very rapid development of the acetylene industry. The table did not include thousands of private installations in use. He discussed the cost and conditions of acetylene central supply installations, and came to the conclusion that an acetylene supply works would be remunerative in Germany in all places of not more than 12,000 inhabitants. He expressed highly optimistic views about the prospects of the acetylene industry.

Acetylene Supply Works in Operation or Constructing.

—	Country and Name of Place.	Number of Inhabitants.*	Price per 1000 Cubic Feet.
	Germany.		
1	Hassfurt	2,500	£3 8 0
2	Oliva	4,215	..
3	Schönsee	1,530	..
4	Ellerbeck	4,176	..
5	Grossenlinden	..	£3 19 3
6	Daaden	1,767	£3 2 3
7	Strelitz.	5,000	£2 13 9
8	Treptow	4,363	..
9	Peiskretscham	4,500	..
10	Achim	3,500	..
11	Sulzburg	1,111	..
12	Allendorf and Soden . .	6,000	..
13	Schlangenbad.	*2,000*	..
14	Dürenberg.	..	..
15	Guttstadt	4,504	£3 10 9
16	Johannisburg	3,000	..
17	Passenheim	1,997	..
18	Sensburg	3,562	..
19	Ratzebuhr	2,298	..
20	Friedland	3,598	..
21	Arys	1,324	..
22	Bischofswerder	1,748	..
23	Frauenburg	2,458	..
24	Saalfeld	2,517	..
	Hungary.		
25	Mezötur	*23,800*	..
26	Totis	11,000	£3 3 9
27	Veszprém	13,000	..
	France.		
28	Alzonne	*2,000*	..
29	Cremieux	*2,000*	..
30	Marcenat	..	..
31	Merchantsville(? U.S.A.) .	*? 2,500*	..
	America.		
32	Wabash	12,500	£3 4 0
33	New Milford	2,500	..
34	Milford (Delaware) . . .	793	..
35	Millbrook (N.Y.)	..	..
36	Corodenbeath	4,249	£3 16 9

[* The figures in italics we have added for the sake of completeness. They are not in the original. Ed. J.G.L.]

The reading of this paper concluded the proceedings of the meeting.

Private Bill Legislation.—Last Thursday was the final day for the deposit at the Private Bill Office of plans and other documents connected with Bills to be promoted or Provisional Orders applied for next session. The deposits were: Railways, 50; tramways, 32; miscellaneous (including Gas, Water, Navigation, and County Council Bills), 97; General Provisional Orders, 133; Electric Lighting Orders, 109—total, 421.

THE BESNARD SYSTEM OF AUTOMATICALLY LIGHTING AND EXTINGUISHING PUBLIC LAMPS.

Numerous as have been the attempts to dispense with the lamplighter and his rod, by the introduction of some system of lighting and extinguishing public lamps automatically, fresh efforts are always being made, with more or less success, to solve the problem. The various systems proposed up to the present time may be divided into two groups—those working by alteration of pressure; and those in which electricity is the agent employed to actuate the mechanism. Systems of the latter class are the more numerous; but those of the former are being added to from time to time. One of the most recent attempts to utilize gas pressure for the automatic lighting and extinction of the burners in public lamps has been made by M. Charles Besnard, the proprietor of the gas-works at Châteaubriant, a town of about 6000 inhabitants, in the department of the Loire Inférieure. His appliance was introduced to the notice of the members of the Société Technique du Gaz en France, at their meeting in Paris last June, by M. Jouanne; and it was briefly alluded to in the abstract of the papers which appeared in the "JOURNAL" a few months ago. He has since supplemented his communication by some additional particulars as to the working of the system, and they have lately appeared in "Le Gaz," of which he is the Technical Editor.

The appliance is shown in the accompanying illustrations—fig. 1 being a vertical section of the lighter as adapted to the flat-flame burner of a public lamp; and fig. 2 showing it employed in conjunction with an incandescent burner. It consists of a

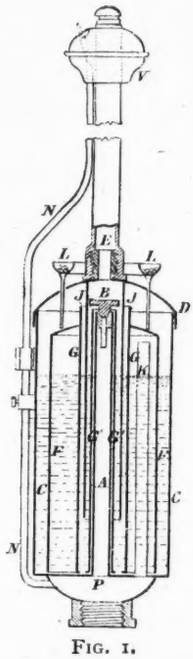


FIG. 1.

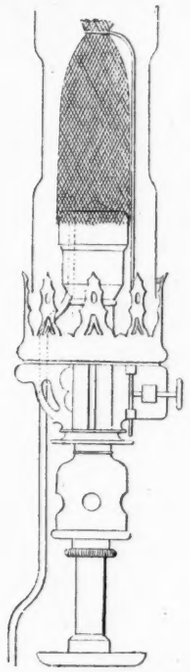


FIG. 2.

cylinder C, having a convex cover D. At the bottom of the cylinder is a cup-shaped chamber P, furnished with a union to allow of the appliance being attached to the service-pipe. In the centre of the cylinder rises the gas-supply pipe A; while towards the side there is a smaller one K, which serves to communicate the pressure of gas to the bell F, concentric to the cylinder. This bell has a double sheath G G^1, open at its upper part, and closed at the base by a disc perforated with small holes, which admit into the annular space G G^1 the liquid—either pure glycerine or chloride of calcium—contained in the cylinder. A third cylinder, J, concentric to G G^1, is soldered to the domed cover D, and dips into the liquid sufficiently to form a seal, and leave a suitable path for the bell to travel. The weight must be so adjusted that the bell can only rise when the pressure reaches a certain limit; but as soon as this is attained the bell ascends and raises the sheath G G^1, which coming in contact with the face of the valve B, lifts this also, and opens the gas-passage. The liberated gas enters the pipe E, and flows up to the burner. The automatic ignition of the latter is effected by a small flash-light fed by the tube N, the top end of which is enclosed by a metallic capsule V, which not only protects the flame from gusts of wind, but permits of a smaller consumption of gas. When the appliance is used with incandescent burners, the flash-light pipe may be brought up into the mantle, as shown in fig. 2; the quantity of gas burnt being so small as not to cause any blackening of the mantle when the burner is not in use.

In fig. 1 the appliance is shown at rest. During the daytime, the pressure having been suitably adjusted, the bell stands upon the bottom of the cylinder, and the valve B closes the gas passage. The weight of the bell is regulated by means of lead shots put into the annular cup L, which is supported by rods rising from the top of the bell, as shown. We will suppose that the bell has been regulated to move upwards when the pressure reaches 24-10ths. As soon as this is attained and increased—say to 26-10ths—the bell rises, opens the valve, and allows the incoming gas to pass to the burner, where it is ignited by the flash-light. In order to extinguish the gas, all that is necessary is to take off the pressure sufficiently to cause the bell to descend and shut off the supply of gas. The appliance will work with variations of pressure of 2-10ths or 3-10ths; and these are not likely to cause inconvenience to private consumers.

It must be borne in mind that the application of any self-lighting system which is based upon variations of pressure will encounter, in its practical application, various difficulties which it will not always be possible to overcome. The first condition to be attained, in order to ensure accurate working, is a regular and constant pressure during the whole period of lighting; and the manager must be in a position to adjust the pressure with precision at the works, and vary it each day at the desired hour, within settled limits. The extent of the canalization, differences of level in the district, and other matters, may give rise to insurmountable difficulties; and therefore one must be careful not to rely too implicitly upon self-lighting systems of the kind under consideration. The Besnard appliance has, however, been fitted to practically all the public lamps in Châteaubriant; and the results are stated to have fully realized the expectations of the inventor. There are altogether 120 burners in use, of which 117 are flat-flame, two are large Denayrouze burners, and one is a Welsbach. Lighting is started at dusk and discontinued at eleven o'clock. The lamps are not lit on bright moonlight nights; so that the periods of lighting are from 20 to 22 days per month. In October, all the lights were extinguished at the same time; but it was intended later on to keep 20 lamps going till daybreak. The day pressure at the works is 12-10ths; the night pressure, 24-10ths. The lighters have been regulated so as not to act until the pressure reaches 18-10ths, and to shut off the gas as soon as it falls below this point. When the all-night service is brought into use, the lighters of these lamps will be regulated to operate when the day pressure is exceeded; and extinction will take place when this limit is no longer passed. Consequently, the eleven o'clock lamps will remain adjusted to the 18-10ths limit.

Since the system has been in use at Châteaubriant, several opportunities have been afforded for observing the effect on the appliance of the sudden and temporary lighting and extinction of a number of burners only lit occasionally. For instance, on race days the extra lighting has not perceptibly affected the public lamps. The system may not be generally applicable in large towns, where variations of pressure are less under control than they are in small ones; but the inventor believes there are many places larger than Châteaubriant where it could be profitably employed. The advantages which he claims for it are the economy resulting from dispensing with lamplighters and simultaneously extinguishing all the lights, thereby reducing consumption, and the prolongation of the life of the lantern from the fact that it can be more securely closed than when the lighting-rod has to be introduced. On the other hand, there is the initial expense of adapting the system to the ordinary lighting plant; and there is the cost of the gas consumed by the flash-light, although this is really insignificant—say $4\frac{1}{2}$ cubic feet in 24 hours. In places where the public lamps are not lighted on the nights of full moon, the flash-lights are turned off at the commencement of this period, and started again when the service is resumed.

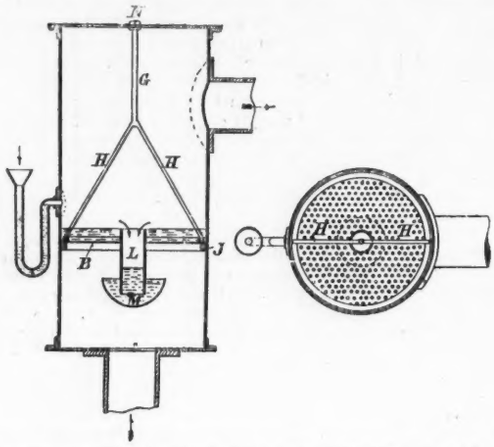
The Solvent Properties of Sulphur Dioxide.—The only ionizing inorganic solvents hitherto found, in addition to water, are nitric acid and liquefied ammonia. In the current number of the "Berichte," Professor Walden, of Riga, gives a preliminary account of experiments with liquid sulphur dioxide, which shows that this liquid acts to an unsuspected degree as a solvent for inorganic and organic substances. Referring to this matter, "Nature" says that since it permits of double decompositions, and gives electrolyzable solutions, liquid sulphur dioxide must now be reckoned as an ionizing solvent. The electrical conductivity of salts in sulphur dioxide solution is not the same in order as that in aqueous solution; nor does the molecular elevation of the boiling-point in liquid sulphur dioxide correspond altogether with that found in aqueous solutions.

The Effect of Thames Water on Boilers.—The Chief Engineer of the Manchester Steam Users' Association (Mr. C. E. Stromeyer) states that last year the long-continued drought was the cause of numerous collapses of boiler furnaces, as many of the feed-water supplies had become heavily charged with mineral salts. A somewhat similar experience is being passed through by those London steam users who draw their feed water from the Thames; and he strongly urges them to have their boiler water tested daily with a salinometer; or, better still, use water from the mains. According to Mr. Stromeyer, the Thames water, even above London, is much more brackish now than formerly; and boilers which for years past have been fed with Thames water without giving trouble, are suddenly suffering from collapsed furnaces and excessive corrosion, traceable to an excess of sea salts in the water.

REGISTER OF PATENTS.

Gas-Washer.—Dowson, J. E., of Old Queen Street, Westminster, S.W. No. 25,866; Dec. 7, 1898.

The chief object of this invention is the removal of tar and condensable products, as well as coal dust, ash, and other impurities, from water gas, generator gas, or producer gas, and the like, by passing the unclean gas through small holes or openings in a horizontal diaphragm or screen, while at the same time water is allowed to flow on to its upper surface in the opposite direction to the current of gas. Some of the water, of course, escapes downwards through the holes in the diaphragm; but the ascending currents of gas, in a state of fine division, not only cause the water to be agitated and split up, but check its flow through the holes.

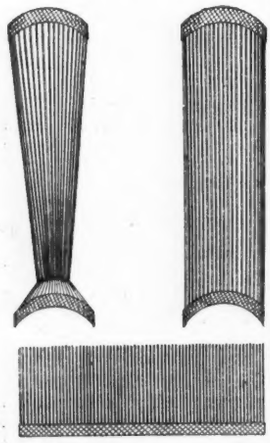


As shown, the vertical casing (preferably a cylinder) has a horizontal perforated diaphragm or screen B, at a convenient height above the lower end. The diaphragm rests on a ring J, or other projection, inside the casing; and passing through the top of the washer is a rod G, with two or more legs H, and a ring, with a contrivance at N so that the ring may be pressed downwards on the top of the diaphragm to prevent water passing between it and the ring J. Attached to the casing is a syphon, for admitting water above the top of the diaphragm. In the middle of the diaphragm is an overflow L and seal-cup M, for regulating the depth of water required on the upper surface of the diaphragm.

The patentee points out that a suitable size for the holes in the diaphragm is about $\frac{1}{16}$ inch diameter; and the number of holes should be proportioned approximately to the volume of gas to be passed through the apparatus in a given time. When the volume is to be considerably less than the maximum for which the apparatus is made, it is better to place a plate or ring over part of the diaphragm, so as to reduce the total area of the openings through which gas can pass. Small adjustments of this kind are not necessary; but plates or rings are convenient for reducing the maximum area 25 or 50 per cent.

Mantles for Incandescent Gas-Burners.—Missire, F. & M. L., of Paris. No. 26,221; Dec. 12, 1898.

The object of this invention is to provide mantles composed of threads made of precious metals, upon which are fixed certain salts of rare earth, so that the salts form part of the threads, and are in the shape of small tubes encircling them.



The illustration shows (1) a series of threads coated with salts, and arranged in the shape of a fringe; (2) coated threads forming a tube or sleeve; and (3) coated threads forming a cone.

The mantles are produced as follows: Threads of iridium, palladium, rhodium, ruthenium, osmium, gold, and (preferably) platinum are coated with salt adapted to become incandescent—*i.e.*, with the nitrates or acetates of rare earths such as thorium, cerium, didymium, lanthanum, zirconium, yttrium, &c., either combined or not; and the coating applied by means of a solution or in any other suitable way. The nitrate or acetate is fixed upon the threads by the action of a bunsen flame, whereby oxide of the rare earth is produced and adheres to the threads, hardens and forms part of them, and constitutes tubes of varying thickness and having irregular rough surface. The oxide within the thread acts "as a condenser or a conveyor of oxygen to the coating tube."

In order to employ the threads so coated with oxides of rare earth, for producing incandescent light, they are arranged either in the shape of a fringe and secured over a certain length of a bunsen flame, or else, "to obtain a more rational application of threads, they may be arranged to form cylinders or cones or the like, or they may be woven to form a mantle of any preferred shape."

Mantles for Incandescent Lighting.—Kayser, H., of Berlin. No. 26,856; Dec. 20, 1898.

This invention, relating to mantles for incandescent lighting, has for its object to render such mantles more adaptable for use in connection with low-pressure flames, such, for instance, as in lamps in which the illuminant is conveyed to the point of combustion by wicks; the main feature of the improvements consisting in the formation of the upper portion of the mantle different to that of the lower end or body, in the means for connecting one part to the other, and in the provision of interstitial apertures operating as exits or overflows for the gases moving within the mantle.

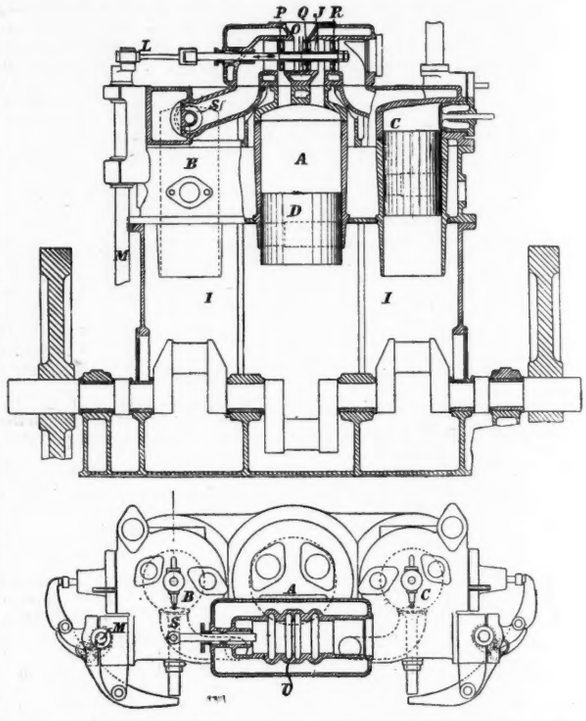
Internal Combustion Engines.—Crossley, W. J., of Manchester, and Atkinson, J., of Marple. No. 27,041; Dec. 22, 1898.

The patentees propose to make the combustion end of an internal combustion engine with metal of approximately similar thickness round the actual combustion chamber and in the outer shell, and joined by suitable ribs or passages; there being a large opening in the outer end of the outer shell closed by a detachable cover, so as to make a casting not liable to casting strains and provide convenience for thoroughly cleaning the water-surfaces of the water-jacket.

Compound Gas-Engines.—Crossley, W. J., of Manchester, and Atkinson, J., of Marple. No. 27,042; Dec. 22, 1898.

In this compound internal combustion motor, the patentees employ three cylinders—two of them being high-pressure cylinders, in which the charge is drawn in, compressed, ignited, and expanded on the ordinary "Otto" or four-stroke cycle, and the other being the low-pressure cylinder.

The engravings are: A sectional elevation through the cylinders and main bearings, and a plan of the upper part of the engine.



The low-pressure cylinder A is preferably placed between the high-pressure cylinders B and C. It has its piston D connected, in the ordinary manner, to a crank-pin on a crank-shaft common to all the cylinders. The high-pressure cylinders have their pistons connected to crank-pins in such a manner that they complete their inward and outward strokes together, but at an interval of 180° from the crank-pin of the low-pressure piston—that is to say, when the high-pressure pistons are at their furthest-in position, the low-pressure piston is at its furthest-out position. The low-pressure cylinder A is about twice the area of the high-pressure cylinders B and C; and the mouths of all the cylinders open into an enclosed chamber I, containing the crank-shaft and the connecting-rods. Owing to the positions of the cranks and the areas of the pistons, the pressure in the enclosed chamber, of course, remains uniform during their movements. The low-pressure piston and its connecting-rod are made about the weight of the two high-pressure pistons and their connecting-rods; so that, by balancing the rotating parts, the engine is "suitable for running at a high rate of speed without causing any material vibration or requiring heavy foundations."

The valves for the admission of gas and air, and for the exhaust of the high-pressure cylinders, are similar to those used for ordinary engines; but they are so arranged that the working strokes are made alternately—thus providing for an impulse each revolution. After a working stroke in either high-pressure cylinder, the exhaust takes place into the low-pressure cylinder; and as these exhausts occur alternately from either high-pressure cylinder, power is given out by the low-pressure piston once every revolution and between the working strokes in the high-pressure cylinders. Power is thus given out twice per revolution, when ignitions are allowed to take place continuously in the high-pressure cylinders.

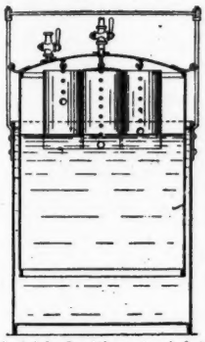
Interposed between the high-pressure exhaust valves and the low-pressure cylinder, a valve J is placed—a piston valve driven by an eccentric or crank-pin L on one of the cam-shafts M, which revolves once for each two revolutions of the engine crank shaft. By means of two ports into the low-pressure cylinder, a port O into the atmosphere, and three pistons or discs P, Q, and R, forming the piston-valve, the following sequence of operations takes place: Passage clear for the exhaust

from (say) the left high-pressure cylinder B to the low-pressure cylinder A, owing to the position of the piston valve; but the actual timing of this exhaust deferred and defined by the opening of the left high-pressure exhaust valve S. Outward stroke of the low-pressure piston D, towards the end of which the exhaust from the low-pressure cylinder to the atmosphere is opened by the piston valve J. Free passage opened from the left high-pressure cylinder to the atmosphere, while its piston is at about its inward dead-centre, and just before it commences its suction stroke—both piston valve J and exhaust valve S being open. [This position is shown. The disc P of the valve J is not so wide as the port, and so leaves a free passage from the cylinders B and A to the atmosphere. The valve J at this time is moving in the direction shown by the arrow.] Passage from the left high-pressure cylinder cut off by the disc P of the piston valve. Inward exhaust stroke of the low-pressure piston; the left-hand piston port being open to the port O, the exhaust continuing throughout the greater part of this stroke by these passages through the piston valve J being open. Opening of the exhaust passage from the right high-pressure cylinder by the piston valve; but the actual timing of this exhaust deferred and defined by the opening of the right high-pressure exhaust valve. Closing of the exhaust from the low-pressure cylinder A by the piston valve J, so as to provide for a compression filling its clearance spaces. Opening of the right high-pressure exhaust valve. Outward stroke of the low-pressure piston D, towards the end of which the exhaust from the low-pressure cylinder A is opened by the piston valve J. Free passage opened from the right high-pressure cylinder C to the atmosphere, both the piston valve J and the high-pressure exhaust valve being open; while its piston is about at its inward dead-centre and just before it commences its suction stroke—the disc R of the valve J being opposite the right-hand piston port, but not being so wide as the port, a free passage is left from the cylinder A and the cylinder C. Passage from the right high-pressure cylinder C cut off by the piston valve J. Inward exhaust stroke of the low-pressure piston D; the exhaust continuing through the greater part of this stroke by the piston valve J being open. Opening of the exhaust passage from the left high-pressure cylinder B by the piston valve J, but the actual timing of this exhaust deferred and defined by the opening of the left high-pressure exhaust valve S.

Thus the cycle of movements is completed by one backwards-and-forwards movement of the piston valve J, while the engine makes two complete revolutions; and in a quick-running engine, the slower reciprocation of the piston valve J is a great advantage.

Acetylene Gas-Generator.—Steiner, L., of Bucharest, Roumania. No. 10,151; May 15, 1899.

This invention relates to apparatus in which a bell, with carbide holders fitted to it, is immersed directly in a water-tank; the distinguishing feature being that the several carbide holders are provided with water inlet-openings, placed at various heights, so that one carbide holder after the other is worked in proportion to the consumption, without any excessive production of gas being possible.

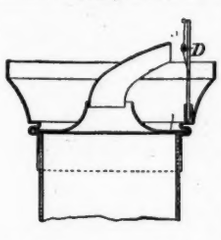


As shown, the carbide holders—six in number in the arrangement described—upon the descent of the bell, are immersed in the water in the tank; and the generation of gas is effected proportionately to the consumption, as the lower the bell descends the greater the amount of carbide in the holders brought into contact with the water through the inlet-openings. But when the generation of gas has proceeded to a certain extent, it is interrupted automatically by the ascent of the bell. The carbide holders consist of a number of vessels (arranged in a circle, and furnished with water inlet-openings), all suspended at the same height. The lower water inlet-openings lie in different planes; so that the generation of gas from one carbide-holder to the other is always effected according to the quantity of gas consumed. The object of this arrangement is that the whole of the carbide should not be at once acted upon, but be made use of from time to time, and any excessive production of gas be avoided.

Practical experiments have shown, says the patentee, that this is "the only way of obtaining an apparatus which is really safe throughout its working."

Automatically Igniting Gas.—Sarkander, O., and Braun, W., of Berlin. No. 18,302; Sept. 11, 1899.

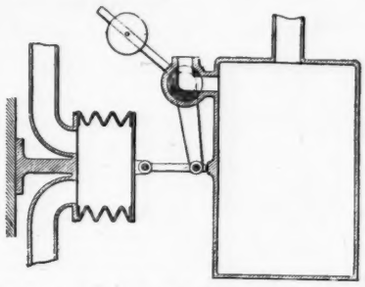
The igniting pellet in this automatic gas-ignition apparatus is not located vertically above the burner, but a part of the stream of gas is guided in such manner as to meet the pellet, which is fixed to a gallery mounted upon the chimney of the lamp. Thus the pellet need not be moved away when the gas is ignited, as with some constructions hitherto employed.



As shown, a gallery mounted upon the chimney of the lamp carries a cone, provided with perforations except at the part immediately below the pellet D. To the upper part of the cone a guide is fixed, in such manner as to concentrate the gas stream and direct it to the igniting pellet, which is suspended to a cross rod by means of platinum wires. When the burner is opened, the gas rises within the chimney, enters the guide, and at the end meets the ignition pellet, which effects the ignition of the gas.

Regulating the Motive Charge Drawn into a Gas-Engine.—Taylor M., of Paris. No. 1858; Jan. 26, 1899.

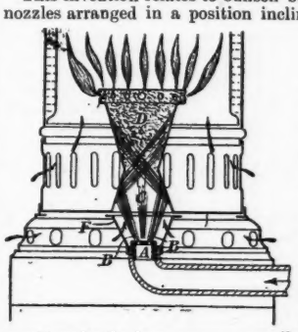
The patentee points out that hitherto it has been impossible to couple a four-phase-cycle gas-engine with a gas-producer from which the gases are drawn by the engine, as the operating piston has to draw in at the same time as the gas the air necessary for the combustion of the gases. "The composition of the explosive mixture is a matter that requires careful attention, even where both the gas and air are under a constant pressure; but where the pressure of the air only is constant, while the pressure of the gas varies (owing to the varying resistances it encounters on its way to, through, and from the gas-producer), the composition of the mixture of air and gas constantly varies, and prevents the proper operation of the engine." The object of this invention is to provide means to overcome these objections.



These consist (as shown) of a receiver or chamber communicating through a pipe with the air suction-valve of an engine. The chamber is provided with an air inlet-cock, which can be opened more or less by means of a lever controlled by a link and by a bellows or flexible bag, one side of which is fixed, while the other is moveable. A pipe, leading from the gas-producer, opens into the bellows; while another pipe connects the bellows with the gas inlet-valve of the engine. A counter-weight is provided for the purpose of maintaining the bellows in an elongated condition, while only a minimum resistance is offered to the gas proceeding from the gas-producer. The lever is connected to a cock which turns with slight friction, so that it may follow the oscillating movements of the lever; the size of the orifice or port of the cock being such that, when the motor is in its normal operation—the bellows being elongated to the full extent, and the cock full on—the cock still sufficiently contracts or throttles the air-inlet of the chamber to reduce the pressure of the air contained in the chamber to a degree somewhat below that of the pressure existing in the bellows; all this taking place when the gas meets with a minimum resistance on its way from the producer.

Burners for Gas-Stoves.—Golby, F. W.; a communication from F. Houben, of Aix-la-Chapelle. No. 16,706; Aug. 17, 1899.

This invention relates to bunsen burners for gas-stoves having gas-jet nozzles arranged in a position inclined to the axis of the mixing-tube.



The *rationale* of the invention is thus given by the patentee: "Bunsen's well-known gas-burner requires a mixing-tube, the length of which is in proportion to the consumption of gas, in order that the gas and air may be thoroughly mixed on its way to the upper opening, and a perfectly uniform and complete combustion be effected. In a gas-burner for the bunsen form of bath-room stove (which consumes about 4 cubic metres of gas or more per hour), the mixing-tube must be of a considerable length—say, about 1 metre for the above-named consumption. This would make the burner unnecessarily high; and a bath-room stove combined with the ordinary heating-stove, now frequently in use, would reach a considerable height, which would render the handling of the gas-cocks very difficult, and the setting up of such combination stoves impossible in bath-rooms with low ceilings. The purpose of this invention is to effect the mixture of gas and air in gas-burners for large consumption by using a comparatively short mixing-tube."

The mouthpiece A of the gas-pipe, which is surrounded by the air-inlet F, and turned towards the mixing-tube C, is provided with gas-jet nozzles B, the axes of which are inclined towards the axis of the burner, so that the conical gas-jets issuing through these nozzles at an acute angle strike the interior of the mixing-tube C D, and from there glance off at a corresponding angle. The gas-jets therefore cross one another frequently, and mix thoroughly with the air drawn in at F—"thus producing a thoroughly effective mixture of gas and air," which will reach the burner-holes.

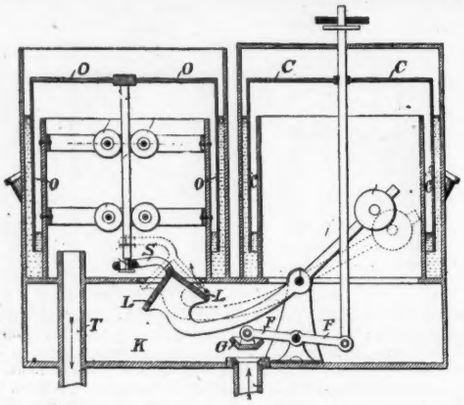
Regulators for Intermittent Gas Supplies.—Hahn. T., of Kötzschenbroda, Saxony, and Mühlenthal, S., and Loewenthal, M., of Berlin. No. 18,436; Sept. 12, 1899.

This is a double-bell anti-fluctuator for preventing the pulsating of gas-engines being felt in the district, and for other like purposes. It is so arranged that, before the gas flows into the bell O (see next page), past the gas inlet-valve, it passes the regulating bell, which, independently of the friction of the bell O, is so loaded that the gas can pass into the latter without any appreciable "back-shock" in the pressure-regulator C and the gas-main; the connecting chamber between the pressure-regulator and the holder-bell being of sufficient size to allow the gas to enter the latter without resistance.

In the casing shown is a box, closed at top, in which a bell C, belonging to the pressure-regulator, and dipping into liquid, works. The bell C is carried by a rod which, at its upper end, passes through the box, but does not fit tightly in the opening, so that the air between the bell C and the upper surface of the gas may slowly escape, as the bell rises, and act as a cushion. The rod is connected to a double-armed lever F, rocking on a pivot, and carrying at its free end a valve G. This latter closes the gas

supply-pipe more or less, and thereby regulates the pressure of the incoming gas.

The gas, on entering, passes beneath the bell C, and, in raising it, forces out the surrounding air, so that the bell is raised without shock by the gas. The adjustment of the valve G, and consequently the pressure of the gas, after entering the chamber K, is dependent upon the position of the bell C. The chamber is of sufficient size to permit the gas to enter the bell O, without appreciable resistance, by the inlet more or less closed



by the valve L. This valve is mounted on a double-armed lever, so balanced by a weight that the valve L may be operated by an extremely small force. The bell O is guided by a central rod P and anti-friction rollers of comparatively large diameter, so as to rise and fall with the least possible amount of friction. At its lower end, the guide-rod P is provided with a pin, which enters a slot in an arm on the top of the valve L. The valve will consequently be raised and lowered only after the bell O has risen to a certain height, so soon as the end of the guide-rod P above the pin strikes against the arm S.

The gas entering beneath the bell C now passes through the open valve L into the bell O, and is forced thence through the pipe T into the motor or service-pipe. The rapidly rising and falling belt O is quickly filled afresh with gas (without any resistance) by the pressure upon the bell C; the gas in the connecting chamber between the bells C and O meeting with no appreciable resistance. The weights upon the rod in the bell C are so adjusted as to accurately take into account the friction of the bell O. If the bell were to have a greater amount of friction in its ascent and descent, then the weights must be increased; and consequently the valve G would be opened to a greater extent, and the gas enter the opening at an increased pressure. The friction for the bell, however, is kept as low as possible, so that the gas may enter the apparatus at a comparatively low pressure; and, as the bell C can only move with a slow and even motion, and complete equalization of pressure exists between the two bells, all "back-shock" in the gas-main is obviated.

Artesian Well Boring.—Moran, P. J., of Memphis, U.S.A. No. 19,407; Sept. 27, 1899.

This invention relates to improvements in artesian water-works systems. Its object is—where the water-level approaches within about 25 feet of the surface—to provide means of connecting the wells, whereby "expensive underground tunnels and connections can be dispensed with, and a surface system established with easy access to all connections and to the wells themselves;" and in systems in which the distance below the surface is greater, "to furnish means whereby the extreme depth of tunnel is avoided, and a system requiring much less depth of excavation is substituted." This is accomplished by the combination with a pumping well and one or more deep-water wells, of suitable syphons, with means of starting, controlling, and stopping the flow of water in them, and with means of disconnecting the wells for cleaning and so on.

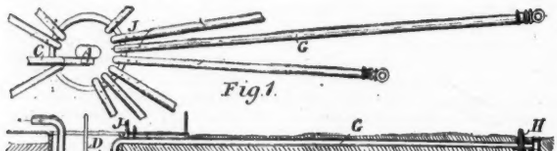


Fig. 1.

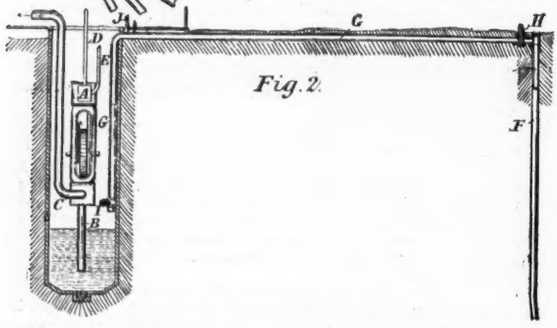


Fig. 2.

Fig. 1 is a plan of the syphons from a plurality of wells leading in o the pumping-well; fig. 2, a sectional elevation of same.

A is the pumping-engine supported in the pumping-well; B, the inflow-pipe; C, the discharge-pipe; and D E, the steam and exhaust pipes respectively. F is the surface end of the artesian well, with its water level only a short distance below the surface of the ground. Extending from the well (at or near the surface of the ground, but preferably enough below the surface to give protection from frost) to a point in the well just above the water-level, is a pipe G forming a syphon. It is provided with valves H near its connection with the well, and I near its lowest end in the pumping-well, just above the water-level of the pumping-well. Similar pipes lead in various directions, as shown by the plan.

To put a well, as F, in operation, the valve I is closed, the valve H and air-escape are opened, and the syphon filled through the pipe J. The air-escape and the pipe are closed, and the valve I opened, allowing the syphon to act and discharge water from the well F into the pumping-well. To disconnect the well for cleaning, the air-escape is opened; the admission of air opening the syphon, and allowing the pipes to drain themselves, and the water in the well to sink to its level.

APPLICATIONS FOR LETTERS PATENT.

22,584.—Driver, W., and Ramsay, J., "Cleaning ascension-pipes." Nov. 13.
22,606.—Doulton, H. L., "Gas and water supply valves for water-heaters." Nov. 13.
22,625.—Foulger, G. F. L., and Glover, J. G., "Torches for incandescent and other gas-lamps." Nov. 13.
22,691.—Kerr, H. A., "Chimneys of incandescent gas-burners." Nov. 14.
22,705.—Webb, J. E., "Lamps for the extraction and destruction of sewer gas." Nov. 14.
22,720.—Simmons, H., "Generation of acetylene gas. Nov. 14.
22,722.—Kessel, L., "Gas-stoves." Nov. 14.
22,724.—Westrop, A., "Acetylene gas-burner." Nov. 14.
22,788.—Richter, S., "Acetylene gas-lamps." Nov. 15.
22,815.—Bate, J., "Globes for gas-lights." Nov. 15.
22,828.—Ross, W., "Acetylene gas-generating apparatus." Nov. 15.
22,838.—Thornton, J. E., and Rothwell, C. F. S., "Gas and oi engines." Nov. 16.
22,986.—Stevenson, W. H., "A combined gas regulator and indicator." Nov. 18.
23,032.—Johnson, J. Y., "Acetylene gas-burners for use in incandescent lighting." A communication from Compagnie Française de l'Acetylene dissous. Nov. 18.
23,073.—Bailey, J. W., and Clapham, J., "Purification of acetylene gas. Nov. 20.
23,082.—Foulger, G. F. L., and Glover, J. G., "Lighting street and other lamps." Nov. 20.
23,088.—Wilson, J., "Gas-burners." Nov. 20.
23,097.—Child, J. F., and White, R. J., "Pressure control apparatus." Nov. 20.
23,099.—Edgar, W., "Lighting incandescent gas-lamps." Nov. 20.
23,106.—Bormann, J. G. L., "Increasing the illuminating power of incandescent gas and other lamps." Nov. 20.
23,138.—Miles, W. P., "Determining the flow of liquids." Nov. 21.
23,145.—Matthews, J., and Vann, T., "Gas or oil engines." Nov. 21.
23,149.—Wright, J. W. B., and Jeffreys, E. A., "Generation of acetylene gas." Nov. 21.
23,179.—Turner, T. G., "Generating acetylene gas." Nov. 21.
23,229.—Winkler, H., "Incandescent gas-lamps." Nov. 21.
23,236.—Abel, C. D., "Gas-engines." A communication from The Gasmotoren Fabrik Deutz. Nov. 21.
23,240.—Palmer, W., "Incandescent gas-mantle steadier." Nov. 22.
23,255.—Armstrong, F., "Acetylene lamps." Nov. 22.
23,265.—Crossley, W. J., and Atkinson, J., "Internal combustion motors." Nov. 22.
23,266.—Crossley, W. J., "Internal combustion motors." Nov. 22.
23,294.—Banks, H. J., "Gas and other fittings." Nov. 22.
23,309.—Smith, G. G., "Acetylene gas-generators." Nov. 22.
23,321.—Foulger, G. F. L., and Glover, J. G., "Lighting street and other gas-lamps." Nov. 22.
23,369.—Menke, C. T., "Gas brackets and chandeliers." Nov. 23.
23,398.—Sugg, W. T., "Low-pressure gas-lighting apparatus." Nov. 23.
23,415.—Naef, P., "Manufacture of gas." Nov. 23.
23,417-8.—Wagner, J., "Mantles for incandescent gas-burners." Nov. 23.
23,426.—Scholl, A., "Hydraulic gas-compressing apparatus." Nov. 23.
23,432.—Kieny, A. L., "Production of acetylene gas." Nov. 24.
23,476.—Dufton, A., and Gardner, W. M., "Lamps." Nov. 24.
23,485-6.—Frank Wright's Prepayment Gas-Meter Corporation, Ltd., and Forster, J. D., "Prepayment gas-meters." Nov. 24.
23,489.—Ackermann, J. F. P., "Acetylene gas-generating apparatus." Nov. 24.
23,505.—Chandler, S., junr., & J., "Gas-stoves." Nov. 25.
23,516.—Orr, P. N., "Gas-stoves." Nov. 25.
23,532.—Thompson, R. W., "Pipe for the conveyance of liquids." Nov. 25.
23,566.—Bernstein, S., "Gas-burners." Nov. 25.
23,572.—Boehndel, H. H., "Gas for illuminating and heating purposes." Nov. 25.
23,578.—Wheat, H. A., "Gas-burners." Nov. 25.
23,582.—Glover, R. T. & J. G., "Regulating gas pressures." Nov. 25.

Costs in the Falmouth Rating Appeals.—The costs of the rating appeals in the Falmouth Union (in which the Falmouth Gas and Water Companies and the Penryn Gas Company successfully resisted a large increase in the valuation of their works) amounted to £2690. The Assessment Committee presented a report to the Board of Guardians last Thursday, in which they said the amount had been reduced from £3100 to £2690; the legal charges for appealing at the East Kerrier Petty Sessions having been disallowed. A discussion followed, in the course of which the Clerk said he had knocked £400 off his bill of costs, and he did not think any other professional man in England would have done it. It was decided to apply to the Local Government Board for power to borrow £1540, the balance of the accounts now due.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

The Stevenson Memorial.

SIR,—May I ask your further kind co-operation to enable me to acknowledge the large number of prompt and generous promises of support received from sympathizers, and to say that a Provisional Committee is being formed for the purpose of calling a meeting at which, by personal attendance or by letter, the views of all can be taken as to the form and scope of the memorial, and as to the disposal of any balance of subscriptions in accordance with what may be found to be the views of the family of the late Mr. Stevenson?

HY. E. JONES.

Stepney, Dec. 2, 1899.

Trade Unionism and Rates of Wages.

SIR,—Although you are of opinion that I might be employing my energies in a better cause (though my cause is not that of Trade Unionism; my letter was rather a plea for a mitigation of that root-and-branch condemnation of all and every of them which, I think, weakens the force of criticism), I must ask space to reply to some of the points in the article on the above subject which appears in this week's "JOURNAL."

In the first place, I have to say that I was not guilty, in writing my original letter, of confounding "labour costs" with "rates of wages." I did not look upon the one term as synonymous with the other. I only omitted to state—because I deemed it within your knowledge—that, in the case in point, the rise in the one was due to the alteration of the latter, coupled with the change of hours. The "rate per ton" is certainly a different matter from the "rate of wage;" but the one is directly affected by the other. My point is this. The labour cost per ton of coal carbonized by the Gaslight and Coke Company was in 1889 raised about 1s. per ton by reason of the Company granting their stokers more wages for less work; the men being paid slightly higher wages for being on duty eight hours than they had previously received for a twelve-hour shift. That is a matter of fact, not of opinion. Since, then, Mr. Livesey, in the answer to the Select Committee which I quoted, declared that the rise in the rate per ton was brought about by the Gas Workers' Union; and since it is known that that rise in the rate per ton was due to an alteration in the rate of wages and hours of labour of the stokers, it is not confusion of thought, but a logical conclusion, to argue that in this particular case the Gas Workers' Union obtained for its members better rates of wages and conditions of service. "One bit of fact," as you say, "is worth any amount of dreaming."

You contend that "rates of wages are determined by supply and demand, not really by 'organization' or its absence." I contend that rates of wages are the resultants of several forces. They are governed partly by the cost of living in the district in which the labourers are employed, partly by the relation of the supply of labour to the demand, and partly by whether the workers in the particular trade are or are not organized. It is, of course, absolutely impossible to prove, to anyone who is determined not to believe, that any rise obtained by an organized body of men would not have been granted to those men had they made their request individually, and without any organization or funds behind them; but to any person whose logical faculty is not overlaid by hatred of Trade Unions, it is perfectly obvious that the rule that a bundle of sticks is more difficult to break than a single one, is no more to be ignored than, and frequently modifies the operation of, the law of supply and demand. It is just as great an error to imagine that the sole determining factor in the rates of wages is the relation of supply to demand, as to imagine that it is to be found in Trade Unionism. Each is modified by the other to a greater or less degree.

It has been frequently urged that, if the Metropolitan Gas Companies would only act in unison in the selling of their residual products, they would obtain better prices therefor. Is that contention unsound? If not, where does the ungovernable law of "supply and demand" come in? Those Companies are totally unable to limit or increase their output of residuals. They could only combine to withhold this output for a time. So can Trade Unions withhold their output of labour for a time by striking. The Companies would obtain their better prices, mainly, through always acting together in asking their own or in accepting, or declining, buyers' terms, and through avoiding the possibility of being played off one against the other. So a Trade Union prevents an employer from beating down individuals by playing off one man against another.

You ask: "How can Trade Unionism rig the labour market, which it does not command?" I, at any rate, never said it could. But it can "rig," to an extent, such portion of the labour market as it does command. The labour market is not an organic whole; skilled trades, especially, having each practically a market of its own. You say, further, that "it cannot be denied that there are hard and selfish employers; but the remarkable thing is that one never hears of Trade Unions taking defensive measures against them." That is to say, no employer whose men belong, for defensive purposes, to a Trade Union, is either hard or selfish! With every respect for your opinion, that is a sweeping certificate of character that I am unable to endorse. It is also one of those statements that are not open to argument, the definition of what constitutes a hard or selfish employer necessarily varying with the opinion of the definer. "One bit of fact is worth any amount of dreaming." True; and "One swallow does not make a summer."

In "carrying the war across the frontier," you have, I think, destroyed your own case. If it be true that the law of supply and demand is the sole determinant of wages, and Trade Unionism is powerless to keep wages up, how can it also be true that Trade Unionism, in defiance of "supply and demand," can keep wages down? The whole point of the contention that Unionism can raise wages, is that it prevents one individual from selling his labour more cheaply than another. The fact that it also results in keeping some individual earnings down, only goes to prove that organization or its absence does interfere with the working of the law of supply and demand.

Finally, I have to thank you for the friendly tone of your article, and to repeat that the reason of my writing my first letter was not that I wished to defend Militant Trade Unionism, but that I regretted that the "JOURNAL"—in admiration of which I yield to none—should weaken its criticisms of the many follies and unjust actions of some Trade Unions by refusing to admit that any Unions have ever succeeded in obtaining for their members the benefit of higher wages and better condions of service. The "JOURNAL" is so consistently broad-minded in its views on every other question affecting the welfare of the working-classes, that it is a source of regret to other readers beside myself that it should refuse to see any other than the worst side of what (however it may be detested) is a permanent feature in the industrial situation—the combination of working-men in what they imagine to be their own interests.

F. G. N.

Nov. 29, 1899.

PARLIAMENTARY INTELLIGENCE.

NOTICES OF APPLICATIONS TO THE BOARD OF TRADE FOR PROVISIONAL ORDERS (SESSION 1900).

Under the Gas and Water Works Facilities Act, 1870.

Abergele Gas.—The Abergele Gas, Coke, and Water Company, Limited, will apply for authority to maintain and continue their existing works, and supply gas within the urban districts of Abergele and Pensarn and the rural district of Abergele, in Denbigh. The usual powers will be applied for. The existing capital is to be defined, and more will be required.

Dungannon Gas.—The Dungannon Gas Company will seek power to maintain, continue, enlarge, and extend their works for the manufacture and supply of gas and residual products in Dungannon and adjacent parishes and townships. Provision will be made for the sale of gas in bulk, the supply of meters and fittings, and levying rates and charges. The Company wish to be authorized to apply their funds and revenues to the purposes of the Order to be applied for.

East Surrey Water.—The East Surrey Water Company wish to have authority to raise additional capital, and acquire, hold, and dispose of lands, buildings, and property.

Elham Valley Gas.—Authority will be sought for the incorporation of a Company to construct works and manufacture and supply gas in the parish of Elham and other places in the county of Kent, under the usual conditions. Borrowing and other powers will be required.

Elham Valley Water.—Notice has been given of the intention to form a Company to construct works for the supply of water in the parish of Lyminge and other places in Kent; and application will be made for the necessary authority to do so. The promoters wish to be empowered to sell or lease the undertaking to any public body, company, or person, on such conditions as they may think fit, or as may be prescribed by the Order. The capital is to be fixed and defined; and provision will be made for increasing it.

Eton Gas.—The Eton Gas Company propose to apply for power to construct and maintain additional works on a new site; to extend the limits of supply, as defined by their Act of 1867, so as to include all or part of the liberty of Boveney; and to substitute a sliding-scale for a fixed maximum price. Permission will be sought to increase the capital and borrowing powers of the Company, and to apply the existing funds; also to alter the standard of illuminating power to 14 candles, or some other standard to be fixed by the Order.

Hayling Water.—Application will be made by the South Hayling Water Company, Limited, for power to raise additional capital, and for an extension of the time allotted by the Orders granted in 1895 and 1898 for the completion of the works therein specified.

Heswall Gas.—Notice has been given of the intention of the Heswall Gas and Lighting Company, Limited, to apply for authority to maintain, continue, and construct gas-works, manufacture and store gas, convert residual products, and supply gas in the parishes of Heswall-cum-Oldfield, Barnston, Pensby, and Gayton, in the rural district of Wirral, in the county of Chester. The usual powers, as well as permission to raise additional capital, will be applied for.

Hoylake and West Kirby Gas and Water.—The Hoylake and West Kirby Gas and Water Company, Limited, will ask for authority to construct and maintain works for the manufacture and storage of gas and residual products on lands now in their possession or to be acquired; and also to carry out new water-works, consisting of a covered service reservoir in Hoylake-cum-West Kirby, an aqueduct or pipe-line, a water-tower, and one or more boreholes. Additional capital will be required.

Irthlingborough Gas.—The Irthlingborough Gas Company, Limited, intend to apply for power to improve, renew, maintain, and continue their existing gas-works, and to manufacture and supply gas within the parishes of Irthlingborough, Little and Great Addington, Woodford, and a portion of the parish of Chelveston-cum-Caldecott, in Northamptonshire. Authority will be sought to sell gas in bulk, convert residual products, make agreements with local authorities and others, and supply gas-fittings and other apparatus. The existing capital is to be defined; and permission will be sought to raise more money.

Littlehampton Gas.—The Littlehampton Gas Company intend to apply for power to construct additional works for the manufacture and storage of gas, and to extend their limits of supply, so as to include the parishes of East Preston and Rustington, and portions of Angmering and Torting'on, in Sussex. More capital will be required.

Lymington Gas.—It is the intention of the Lymington Gas and Coke Company to apply for power to maintain, continue, and construct works for the manufacture and storage of gas and residual products, and supply gas in the borough of Lymington or portions thereof, and in, or in certain parts of, Milford, Hordle, Boldre, Sway, and Brockenhurst, in the county of Southampton. Provision will be made for entering into agreement, laying mains and pipes, selling or hiring fittings or apparatus, and levying rates and charges.

Mablethorpe and Sutton Gas.—Application will be made by the Mablethorpe and Sutton Gas Company, Limited, for authority to maintain and continue their existing works and construct others, manufacture and supply gas engines and fittings, and generally carry on the business of a gas undertaking. Additional capital will be required.

Maidenhead Water.—The Maidenhead Water Company intend to apply for power to raise additional capital.

Romford Gas.—The Romford Gas Company notify their intention of applying for power to raise additional capital.

St. Margaret-at-Cliffe Gas.—It is intended to form a Company to construct works and manufacture and supply gas in East Langdon, Westcliffe, Oxney, and St. Margaret-at-Cliffe, in the county of Kent; and the usual powers will be applied for. The capital is to be fixed and defined; and provision will be made for increasing it.

Sevenoaks Water.—The Sevenoaks Water Company intend to apply for power to raise further capital.

South Elmsall, South Kirkby, and North Elmsall Gas.—Mr. Charles Scholefield, of South Elmsall, in Yorkshire, has notified his intention of applying for authority to maintain and continue gas-works, manufacture and store gas, convert residual products, and supply gas, stoves, fittings, &c., in the above-named parishes or townships. Permission will be sought for the inspection and testing of fittings, and also for the making of agreements with local bodies. The existing capital is to be defined and regulated; and it is proposed to make such provisions with respect to capital and borrowing powers as may be deemed expedient.

South-West Suburban Water.—The South-West Suburban Water Company will apply for authority to raise additional share, loan, and debenture capital.

Steyning and District Water.—The undertakers named in the Steyning and District Water Order, 1897, purpose applying for power to raise more capital.

Tonbridge Water.—The Tonbridge Water Company intend to apply for power to alter and enlarge their present works and reservoirs, and construct additional works. It is proposed to extend the limits of supply, as defined by the Company's Order of 1886, so as to include so much of the parishes of Leigh and Shipbourne as are not within those limits, and also the parish of Penshurst. An increase of capital and additional borrowing powers will be applied for, as well as authority to supply meters, fittings, &c.

Wath-upon-Dearne and District Gas.—It is the intention of the Wath-upon-Dearne District Gas and Lighting Company, Limited, to apply for power to maintain, continue, and construct gas-works, and manufacture and supply gas in the urban districts of Wath-upon-Dearne and Bolton-upon-Dearne, and the townships or parishes of Brampton-Bierlow, Thurnscoe, Hickleton, and Barnborough, in the West Riding of the county of York. The existing capital is to be defined and regulated; and authority will be sought to increase it, and enlarge the Company's borrowing powers.

Under the Electric Lighting Acts, 1882 to 1888.

Applications will be made under the above-named Acts for powers in regard to the supply of electricity for lighting and other purposes in the following places: Alverton, Much Woolton, and District, Banbury, Barmouth, Barnard Castle, Barnet, Barnstaple, Basingstoke, Battersea, Berwick-on-Tweed, Birkenhead, Bishop Auckland, Bonchurch, Boston, Brecon, Bredbury and Romiley, Bridge of Allan and Dunblane, Bridlington, Brierfield, Brierley Hill, Broughty Ferry, Caterham and Warlingham, Cheadle and Gatley, Cheltenham, Chester-le-Street, Clacton-on Sea, Cleckheaton, Cleethorpes, Cobham, Cowpen, Crowborough, Dartmouth, Egremont, Elland, Enfield, Erdington, Exmouth, Farnham, Felixstowe and Walton, Festiniog, Freshwater and Totland (I.W.), Gosforth, Gosport and Alverstoke, Grantham, Harrow, Heaton Norris, Hebburn, Hyde, Hythe, Jarrow and District, Kendal, Lambeth, Leamington Spa, Leek, Limehouse, Littleborough, Liversedge, Llandilo, Llanrwst, Long Eaton, Lytham, Malton, Marylebone, Maryport, Midlands (Staffordshire and Worcestershire), Mile End Old Town, Nantwich, Neath and District, Newark, Newhaven, Nuneaton and Chilvers Coton, Ogmore Valley, Ormesby, Ormeskirk, Oswestry, Penrith, Penzance, Pwllheli, Ramsgate, Redcar, Redruth, Romford, St. George's-in-the-East, St. Helens, Sandgate, Seaford, Seaham Harbour, Sevenoaks, Sheerness, Sheldon and East Thickley, Sleaford, South Blyth, Southwold, Sowerby Bridge, Spennymoor, Staines and district, Stamford, Sudbury, Thirsk, Totnes, Tunstall, Twickenham and Teddington, Uxbridge and District, Wallington, Wellingborough, Weybridge, Whitefield, Witney, Woking, Wormit and Woodhaven. [Applications with respect to electricity supply projects for other places will be made in Private Bills.]

NOTICES OF APPLICATIONS TO THE LOCAL GOVERNMENT BOARD (SESSION 1900) FOR PROVISIONAL ORDERS.

Under the Gas and Water Works Facilities Act, 1870, and the Public Health Act, 1875.

Colwyn Bay and Colwyn Urban District Gas.—Authority will be sought by the Urban District Council of Colwyn Bay and Colwyn, in the county of Denbigh, to purchase the undertaking of the Colwyn Bay and District Gas Company, manufacture gas and residuals, and supply gas, fittings, &c., within the urban district. Borrowing powers will be required.

Ilkeston Corporation Gas.—Application will be made by the Ilkeston Corporation for authority to acquire by agreement additional lands for the purposes of their gas undertaking, and to erect works thereon for the manufacture of gas and residual products.

Rothwell (Northampton) Gas.—The Urban District Council of Rothwell, in Northamptonshire, will apply for authority to purchase the undertaking of the Rothwell Gaslight, Coke, and Coal Company, Limited, maintain and construct gas-works, and supply gas, residual products, fittings, and apparatus. Power will be sought to borrow the necessary money.

Halifax Gas Employees and the Union.—A ballot of the men employed at the Halifax Gas-Works has been taken with the view of ascertaining whether or not they desire to conduct their negotiations with the Gas Committee through the officials of the Union. By a majority of about eight to one, the men's decision was in the affirmative.

LEGAL INTELLIGENCE.

HOUSE OF LORDS.—Thursday, Nov. 30.

(*Before the* Lord Chancellor, *Lord* Macnaghten, *and Lord* Morris.)

Hampton Urban District Council v. Southwark and Vauxhall Water Company.

This was an appeal from a decision of the Court of Appeal, dated Dec. 8, 1898, affirming a decision of Justices Wright and Darling, sitting as a Divisional Court, given on the 18th of the previous March.* The respondents were the occupiers of a reservoir, in respect of which certain general district rates had been levied pursuant to section 211 of the Public Health Act, 1875; and the question was whether, according to the true construction of that section, the respondents, as occupiers, were liable to be assessed on the full net annual value of the reservoir, as ascertained by the valuation list for the time being in force, or in the proportion of one fourth part only of such annual value. The section in question, enacted as follows: "The . . . occupier of any land covered with water, or used only as a canal or towing path for the same, ... shall be assessed in respect of the same in the proportion of one-fourth part only of such net annual value thereof." The Court of Summary Jurisdiction ordered that the respondents should pay to the appellants the sums of £97 and £40 8s. 4d., as in respect of the full net annual value of the portion of the reservoir situate within the district of the latter, but stated a special case for the opinion of a Divisional Court. The questions put to the Court were: "(1) Whether the reservoir is or is not 'land covered with water' within the meaning of section 211, subsection 1 (*b*), of the Public Health Act, 1875." "(2) Whether the appellants [the present respondents] ought to be rated in respect thereof, under the said section, in the proportion of one-fourth part only of the net annual value of the said reservoir, or upon the full net annual value thereof." The Divisional Court held themselves bound by the decision in *Regina v. Birmingham Water-Works Company*,"† and reversed the order of the Lower Court; and this decision was affirmed by the Court of Appeal.

Sir E. Clarke, Q.C., and Mr. H. Courthope Munroe appeared for the appellants; Mr. Cripps, Q.C., and Mr. W. C. Ryde represented the respondents, but were not heard.

The Lord Chancellor, in moving that the appeal be dismissed, said that no argument had been adduced to show that the Legislature used the words "land covered with water" in any other than their natural sense, which had been attributed to them by the Courts for more than thirty years. Words would have to be added so as to make the statute run: "Land covered by water which is not made so by artificial construction." No such words had been added; and he could not understand the doubts expressed in the Divisional Court.

The other learned Lords concurring, the appeal was dismissed.

GLASGOW SHERIFF SUMMARY COURT.—Friday, Dec. 1.

(*Before Sheriff-Substitute* Boyd.)

Glasgow Gas Strikers Fined.

To-day eight of the ringleaders in the strike at the Glasgow Corporation Gas-Works, particulars of which were given last week (p. 1324), named respectively Charles M'Kernan, John Blackwood, Thomas Loughlan, Hugh Hatrick, John Grier, John M'Cudden, Robert Foster, and Edward Hart were charged with having been guilty of a contravention of the Conspiracy Act. The complaint stated that the men were employed at the Glasgow Corporation Gas-Works in the Dalmarnock Road, under a contract of service in virtue of which they were bound to give to the Station Manager 14 days' previous warning before leaving; and that on the 18th or 19th of November they wilfully and maliciously broke the contract by refusing to work. It also pointed out that the probable consequences of their so doing, either alone or in combination with others, would be to deprive the inhabitants of the city of Glasgow to a great extent of their supply of gas; that their action was contrary to the Conspiracy and Protection of Property Act, 1875; and that they were liable to a penalty not exceeding £20, or three months' imprisonment, with hard labour. Each of the accused tendered a plea of "Guilty."

The Procurator-Fiscal (Mr. Hart) conducted the prosecution; Mr. Jeffrey Hunter, Writer to the Signet, represented the accused.

The Procurator-Fiscal asked sentence on M'Kernan, Blackwood, Hatrick, and Hart, remarking that M'Kernan and Blackwood, especially the former, had been the leaders of the men to some extent. Hatrick and Hart were under written agreement of service for nine months, and their case differed from that of M'Kernan. The other accused were only employed on fortnightly notice, without any written agreement; and against them he did not intend to press the charge—the ends of justice, in his opinion, being met by the imposition of a sentence on the four whose names he had mentioned.

Mr. Hunter, on behalf of the accused, said it was quite true that M'Kernan occupied a post of some extra importance in comparison with the other men. Blackwood was pretty much in the position of the other four, against whom the Procurator-Fiscal had not asked for sentence, but had allowed himself to take blame along with the others. Hart and Hatrick were the only two of the others who were under written contract of service. This was fortunately the first case of the kind that had happened in Glasgow, and it had been an unfortunate affair from first to last. It was not so much a strike as a delay to begin work, in consequence of a grievance the men had. The Corporation Gas Committee, in common with all other Committees of the Corporation, resolved May last that ratepayers—all things equal—should get preference in applying for jobs in their works. On this occasion several non-ratepayers, among them a young man from the country, got jobs; and this formed a grievance on

* See "Journal," Vol. LXX., p. 953; Vol. LXXI., pp. 656, 724; and Vol. LXXII., p. 1362.

† *Ibid.*, Vol. X., p. 304.

the part of the men. It was not the case that the dispute arose out of the fact of non-union men being employed. As a matter of fact, such men were employed without any objection from the Gas Workers' Union. However, one man, named Wilson, was put on to a special post worth 5s. a week more than the other men received. The object of the gaffer, Mr. Hunter said, was to discredit the Union as much as possible; and Wilson had been put to this post with the object of exasperating the unionists. The Gas Workers' Union had 45,000 members; and it was acknowledged by nearly every corporation in England. It had only recently been established in Glasgow; but for all that it had ten branches, with a membership of 2000. There had been no demand on the part of the men for shorter hours or increased wages, because they were perfectly satisfied with the conditions of labour existing at the Dalmarnock works. He was glad to say the Corporation of Glasgow were model employers. All that was in dispute was that the printed resolution of the Corporation should be adhered to. In order that this should be done, the men stopped their work, and walked about in groups for five hours discussing the matter. Directly it was found that the men had contravened their contracts of service, they presented themselves at the works, but were refused admission. Unfortunately alarmist articles had appeared in the papers.

The Sheriff: I have nothing to do with that.

Mr. Hunter proceeded to say that the object of these articles was to show that the town might have been left in darkness; but on two previous occasions the towns had been so left, and yet the citizens rose to the occasion—they kept cool, and there was no damage to life, limb, or property. On this occasion there was no immediate danger, as there was a certain supply of gas left, and the men were willing to renew their work. The accused had been brought before the Court because they were the best eight men in the employment—sober men, with long terms of service; and it was thought that by punishing the best employees a sharp lesson would be taught to others. A point in favour of the accused was that the Gas Committee considered that, having now dismissed these eight men permanently from their employment, sufficient punishment had been dealt out. In the whole circumstances, Mr. Hunter appealed for a pecuniary penalty.

The Sheriff said the accused were servants of the Corporation and responsible for the supply of gas to the city of Glasgow. They were also under contract to give a certain warning before they left their employment. The object of the contracts was to provide for continuity of service, so that there might be no interruption in the supply of gas in the city. Any child could understand that a suspension of the service might be disastrous. The steady supply of gas to the city involved in the very highest degree the safety of life, limb, and property. It was right that the accused and people who still remained in the service of the Corporation should understand that no grievance with others against that body would be accepted as an excuse for breaking their contract. The fact that such a thing could be done by the best workmen only served to show what might be done by the worst. He, however, was disposed to think that this case would act as a warning to the rest of the employees in the service; and with this object in view, he would stop short of imprisonment, but fine M'Kernan £7, and the others £5 each.

WREXHAM COUNTY COURT.—Saturday, Nov. 11.

(*Before Sir* Horatio Lloyd, *Judge.*)

Clark v. Brymbo Water-Works Company.

A special sitting was held by his Honour to-day to hear an action brought by Mr. E. Stanley Clark, of Oak Alyn, Gwersyllt, proprietor of the Llay Hall Colliery, against the Brymbo Water Company, to recover £25 18s. paid by him to them under duress.

Mr. S. Moss, M.P., appeared for the plaintiff; Mr. Tobin represented the defendants.

Mr. Moss, in opening the case, said that since 1896 there had been disputes between Mr. Clark and the defendants; the latter alleging that the quantity of water consumed at the plaintiff's residence was in excess of that necessary for domestic purposes. The rate paid by Mr. Clark was £1 14s. per quarter, in addition to which he paid for the use of water for the gardens, horses, carriages, and a fire-plug; these "extras" bringing up the amount payable quarterly to £2 18s. Towards the end of 1896, the Company, after having affixed a meter at the junction of their mains with the plaintiff's service-pipes, wrote that it indicated the average supply at 1466 gallons daily. The consumption for the previous five quarters had been 170,000, 165,000, 95,000, 118,000, and 109,000 gallons. They offered to supply the plaintiff with 34,000 gallons per quarter in return for the rate of £1 14s., and any quantity in excess would be charged for at the rate of 1s. per 1000 gallons. Plaintiff did not accept this offer; and, after a lengthy correspondence, the Company, in September, 1897, cut off the supply to Oak Alyn. Plaintiff then laid a pipe to the colliery, where he was furnished with water for trade purposes, and thus drew a supply for domestic use; but in May of the present year the Company claimed a sum of £25 18s., the amount which would have been due for a supply by meter, and threatened that if this were not paid the supply to the colliery would be cut off. The threat was carried out, and subsequently the amount was paid.

Mr. Tobin, for the defence, contended that, even if the cutting off in May last was a wrongful act, the plaintiff was out of Court; his remedy being to summon the Company before Justices for penalties. Instead of adopting this remedy, he requested them to continue to supply him with water for all three purposes—colliery, domestic, and other than domestic. With regard to two of these, he had no right to make the demand he did; while as to the supply for domestic use, it was necessary that he should tender the rate, and lay a ½-inch pipe. The latter condition he had not fulfilled; the pipe being a ⅝-inch one. The Company had a right to say, as they did, that they would not supply plaintiff with water, even for his house, until he paid such a sum as they demanded. But they had all along been willing to supply him with 34,000 gallons of water per quarter—or 51 gallons per diem for each of the seven occupants of the house—for £1 14s., the quarterly rate, and to let him have water for other purposes at 1s. per 1000 gallons. He asked his Honour to say that the Company had fulfilled their obligations, and that the plaintiff was not entitled to succeed.

Judgment was reserved.

Stealing Gas.

On the 21st ult., at the Birmingham Police Court, a hairdresser named George Russell was charged with having stolen a quantity of gas, the property of the Gas Department of the Corporation of Birmingham, between the 3rd ult. and the 19th inst. The suspicions of the gas inspectors were aroused, apparently owing to the fact that although defendant had two incandescent burners and other jets burning, the meter registered a very small amount; and the house was watched from Sept. 30. The previous Sunday Detective-Inspector Baker and Detective-Sergeant Moxon visited the premises, and found that the prisoner had disconnected the gas-meter from the main, and substituted for the connection an india-rubber tube, by means of which he obtained the whole of the gas for his house without the meter registering it. It was said that, on a moderate computation, the prisoner had been stealing about 189 cubic feet of gas per day. Prisoner pleaded guilty, and said he committed the offence through stress of circumstances. As it was his first offence, the Stipendiary gave him the chance of paying a fine of £5 and costs, or one month's imprisonment in default.

Theft of Coal from the Devonport Gas Company.

A theft of a mean and petty character was investigated by the Devonport Magistrates on Tuesday week, with consequences of a particularly serious character to one of the men concerned. A carter named Edwin Penrose, who was in the employ of a hawker in the town, was on the previous day sent with a load of coal in bags from the wharf where the cargo was being discharged to the gas-works. On the way, he was seen to enter a public-house, kept by a man named Brimblecombe, and take in a bag of coal. Penrose was subsequently arrested, and said he received beer in exchange for the coal. Proceedings were also taken against Brimblecombe for receiving the coal knowing it to be stolen. On behalf of the publican, the defence was set up that he thought Penrose was still in the employ of a coal merchant with whom he formerly had dealings, and that he bought the coal at his earnest solicitation, and paid 1s. for it. The Magistrates disbelieved the defence, and fined each of the men £1 and costs, or one month's imprisonment. The Chief Constable pointed out that, as the result of his conviction, Brimblecombe was incapacitated in law from being a publican, and could not keep his house open a moment longer.

Goole New Water-Works.—For the purposes of their new waterworks, the Goole District Council have decided to purchase 7 acres 23 perches of land at Pollington for £1100. Lord Deramore had previously asked £300 an acre for an adjoining site scheduled under the Council's Bill.

The Price of Gas at Mountain Ash.—On Oct. 3 last, the Mountain Ash District Council passed a resolution reducing the price of gas from 4s. 6d. to 4s. per 1000 cubic feet. They have soon changed their minds on the subject; for last Tuesday they rescinded their previous decision by eight votes to six. The price will therefore continue at 4s. 6d.

Town Lighting by Acetylene.—The town of Tata Tovaros, in Hungary, has been provided with a system of lighting by acetylene for both public and private purposes. The supply-pipes are laid as for ordinary gas; no special precautions, it appears, being taken to prevent leakage at the joints. The calcium carbide has to be obtained from France or Switzerland, as there are no local works for the supply of electricity.

Fatal Acetylene Explosion.—News reaches us, through Reuter's Agency, of an explosion of acetylene, due to an escape, on the evening of the 26th ult., at a Château at Flemalle-Haute, near Brussels, occupied by M. de Pierpont, who had placed an acetylene generator in a small tower. It is stated that the *concierge* and Madame de Pierpont entered the place with a lamp, whereupon an explosion followed. The tower was demolished, and the *concierge* was killed; while Madame de Pierpont sustained severe burns.

The General Gas Company of France.—The report of this Company for the twelve months ending June 30 shows that the result of the working in that period was a sum of 3,028,566 frs. (£121,142), as compared with 2,976,960 frs. (£119,078) in the preceding year. Adding the balance brought forward (346,045 frs.), there was a total of 3,374,611 frs. (£134,984). Deducting the general expenses, the amount required to pay the interest on the bonds, the Directors' fees, and other charges, there was left a disposable balance of 1,001,585 frs. (£40,063). At the recent meeting of shareholders, the Directors recommended that 300,000 frs. should be distributed at the rate of 7 frs. 50 c. per share; that 250,000 frs. should be added to the contingent fund; and that the balance of 451,585 frs. should be carried forward. This was agreed to. The dividend declared was 32 frs. 50 c. per share—the same as before; and the reserve fund was increased to 1,444,524 frs. (£57,781).

Trade Unionism in America.—The Unions connected with the building trades, says "Engineering," are generally recognized as the most unreasonable in the country. But, after all, we may well be thankful that matters are no worse, in view of the rules adopted last July by the Journeymen Plumbers' Association of Chicago. These rules establish a standard rate of work, which in many cases is less than half of what was previously accomplished. Thus, working on lead, eight wiped joints are held to constitute a day's work; whereas sixteen had previously been done. In running soil pipe, the number of joints permitted by the new rules is only from one-half to one-third of what was previously accomplished; and so on for other items. Further, in complicated cases, these standards are not to apply. Similarly, the Chicago Carpenters' Executive Council have issued rules of exactly the same character. One of these forbids a man to work on the same job as a non-union carpenter; while another provides that anyone filing, grinding, or repairing his tools out of hours shall be fined not less than $10. Again, any member guilty of working too hard shall similarly be subject to a fine of $5. In the other trades, quite similar regulations are said to prevail; and in no case is any man to do a stroke of work not strictly belonging to his craft. A "walking delegate" found a stonemason chipping a small fin off a casting, in order to make the latter fit a hole the mason had cut in a flagstone, and the latter was promptly fined ten days' pay.

MISCELLANEOUS NEWS.

SKIPTON GAS ARBITRATION.

Tuesday, Nov. 21.

(*Before Mr.* JAMES MANSERGH, *Umpire.*)

The earlier proceedings in this arbitration were reported in last week's "JOURNAL," pp. 1321-24. It was an arbitration to fix the price to be paid by the Skipton Urban District Council for the undertaking of the Skipton Gas Company, under an Act obtained in the first session of the present year. Mr. CORBET WOODALL was Arbitrator for the Company; Mr. CHARLES HUNT for the Council. Mr. LITTLER, C.B., Q.C., and Mr. WAUGH appeared for the Council; Mr. BALFOUR BROWNE, Q.C., Mr. CLAUDE BAGGALLAY, Q.C., and Mr. WALTER BEVERLEY represented the Company. At the conclusion of the case for the Company, evidence for the Company was at once called.

Mr. *W. A. Valon*, examined by Mr. LITTLER, said the present site of the Company's works had the advantage of water carriage, but the disadvantage of being a considerable distance from the railway. It also had the disadvantage of being near to the principal streets, and of having unoccupied scheduled land built upon by adjoining owners. The works would have to be moved out of the town in the next ten or fifteen years, according to the rate of increase; so that the Corporation were well advised in taking power in their Act as to fresh land, and for raising money for substantial works. The works were on a canal; but obviously greater facilities for purchasing coal would result from a railway connection. The recent expenditure on the works was unfortunate. It should have been on another site. It was not an advantage, except that it gave the Council better plant for the present; but it would handicap them in the future. The retorts were through; but for works of this kind firing from one end was objectionable. Each bed should be separate, with a furnace of its own, because with such small works it was impossible to take up or let down twelve retorts. There was a damping place in the middle, which was an objection, if the other side was to be kept to a high temperature. This arrangement was not economical. He should prefer to isolate the retorts, and arrange them back to back; firing from distinct furnaces at each end. The room in front of the beds, also, was not sufficient to allow drawing and charging machinery to be introduced, which was much more economical than hand labour. The old retort-house would have to be cleared away when the new one was extended. It could not be brought into use again, and he had treated it as dead. The purifier, too, should be treated as dead. The other side had taken 6 feet as being sufficient for the condensers, and 7 feet for the scrubber. There should be at least 10 feet for each. There was no tar-extractor nor washer to supplement the scrubber. Each of these pieces of apparatus was too small for the maximum day's make. They represented about 300,000 cubic feet in one case and 313,000 feet in the other, against the maximum of 342,000 feet. The exhausters and purifiers were equal to twice the present make. A new meter-house, capable of passing 30,000 cubic feet an hour, was being constructed. The old meter was certainly too small for its work. The arrangements as regarded tar, liquor, and gasholders were sufficient. Of the total mains of the Company, about a third—7000 yards—was 1-inch pipe, which was not satisfactory. Then some of the mains were of wrought iron, which ought never to be used for the purpose. In the year ending June last, 2233 yards of mains, varying from 12-inch to 2-inch, were laid, at a cost of £929 8s. 9d. Of this he charged one-third for replacement; leaving two-thirds as new expenditure. Besides this, it would be necessary to lay 3-inch mains for the 7000 yards of 1-inch or 1¼-inch pipe, which would cost £1482. During the last seven years, the increase in the number of houses in Skipton had been 43 per annum; and the population between 1892 and 1898 showed only an average annual increase of 113. The consumers increased by 58 over the previous year. He could find nothing to justify the assumption that there was going to be the enormous increase in gas which was suggested. He could not understand, or account for, the large increase of last year. The report of the Manager that the day pressure was 25-10ths and the night pressure 45-10ths, showed that the pressure was high last year. With mains in good order, there was no objection to this pressure; but the pressure last year seemed to have been increased, and from that the increase of gas consumption appeared to have come. He handed in a table relating to over-spent capital, less deductions for deficiencies of works and plant. The amount expended in the year ended June last, was £11,961 5s. 2d., and to Oct. 31, £2794, which, with the sum of £790 to be expended on unfinished contracts, totalled £15,545 15s. 8d., from which he deducted the balance of capital authorized and paid up since June, 1898, £2334, and £4750 the mortgage raised since June, 1898—leaving £8461 15s. 8d. as the net expenditure. From this he made certain other deductions for old works and plant thrown out of use, or to bring the plant to an efficient condition for the manufacture of the daily maximum of 342,000 cubic feet of gas: Purifiers and purifying-house, £1350; retort-house, retorts, ironwork, &c., £2030; new scrubber (less £60 written off by Company), £798; exhausters, sundry connections, &c., say, £500; and allowance for mains, £309 16s. 3d.—being one-third of the capital charge of £929 8s. 9d. in respect of mains, making a total of £4987 16s. 3d. This sum deducted from the £8461 15s. 8d., left the net amount allowed by witness as capital properly expended or incurred by the Company, otherwise than out of revenue, £3473 19s. 5d. Having further explained these figures, he said it would be many years before the works provided would come into use; the normal increase in consumption having only been 4·09 per cent. Practically every house in Skipton—within 150—was taking gas; leaving a possible 100 which might take it. Having regard to this fact, it would be of little good to introduce the prepayment system. In this figure of £3473, he had given the Company credit wherever the works had been in excess. He thought the claim that this money, which was expended a few years ago, and was going to be refunded at once, should bear interest at 7½ per cent. for 30 years, and be capitalized on that, was quite unreasonable. He was in the House when the agreement was made. What was in his own mind then, and what was in it now, was that the Company were laying out a large amount of money building works, so that they could not possibly say: "We will only build a gas-works capable of producing the maximum quantity for this year of 342,000 cubic feet." His side thought it only natural that the Company must have works with a margin, and therefore that this margin should be paid for. The Council were going to take the works, and the Company were to find the money temporarily for the purpose. They never discussed any claim for treating it as capital to be raised and apportioned among the shareholders (nor even put up for auction), the same as their old capital. To capitalize that at 30 years' purchase was never dreamed of. It was looked on as an overdrawn amount on the bankers, which would be discharged by the Corporation. Witness next put in a statement showing whether the profits were sufficient to pay maximum dividends, interest, &c. His first figure was gross profits for the half year of £1855 19s. 11d., from which he deducted £20 4s. the rent of cottages on the site of the works, which must be cleared away, £7 3s. 4d. the rent of yard to expiry of tenancy, and £1 transfer fees. The repairs and maintenance of works and mains, as per the accounts, equalled 1·39d. per 1000 cubic feet sold; but he held that the average should be 4·50d.—the difference being 3·11d., which on the figures of sale equalled £381 11s. 11d. In regard to the mortgage of £4750, he allowed interest at 4 per cent. for the half year, £95, which was fair seeing that the Company had had the benefit of this expenditure. In the same way, the interest on over-spent capital account, £8461 15s. 8d. at 4 per cent., equalled £169 4s. 7d. Then there were the dividends at 9 per cent. on £7000, and at 7½ per cent. on £14,000, which worked out to £840. Deducting these sums from the £1855 19s. 11d., left £341 16s. 1d. as the balance for the half year. He pointed out, however, that the consumption of gas for the year ended April 30, 1898, was 52,995,900 cubic feet, while for the half year ended June last it was 29,447,600 feet, or doubling this quantity to obtain an estimate of the amount for the whole year 58,895,200 cubic feet—an increase of 5,899,300 feet, or 11·13 per cent. In his opinion, this extraordinary increase was due to some disturbing cause not satisfactorily explained by the Company. He therefore corrected the gross profit on the basis of the average increase in consumption in 1898 over 1889—which was 4·09 per cent.—and the abnormal increase for the half year to June, 1899, 11·13 per cent. The difference between these two figures—7·04 per cent.—he halved, and took this percentage of the 52,995,000 cubic feet, amounting to 1,815,955 feet, which, at 15·13d. per 1000 cubic feet, as profit earned, less the increased price of gas of 2·5d. per 1000 feet, equalled 12·63d., or £95 11s. 3d. He went on to deduct 2½d. per 1000 cubic feet from the price of gas, which was raised on Nov. 1, 1897, to 2s. 11d., so as to reduce it to 2s. 8½d., the price from 1885 to 1897. This meant a sum of £304 1s. 2d., which, with the £95 11s. 3d., made £399 12s. 5d. This, as against the balance of £297 9s. 8d., left a deficit for the half year of £102 2s. 9d., or for the whole year of £204 5s. 6d. Having regard to these figures, he did not call the income magnificently secured, nor did he understand why the Company should claim anything like the number of years' purchase they did. In his valuation, he commenced with the maximum dividend payable—viz., £1680—which he capitalized at 25 years' purchase, giving £42,000. He did not think whether a company was a standard price or maximum dividend concern made much difference in the market value. Gas property generally fetched according to what it was paying, whether it was a standard or maximum concern. As to the undertakings fetching 3, 3½, or 4 per cent., he said he had invested in statutory companies in the last six weeks at over 4 per cent., and had often done so before at 4½. To the £42,000, he added the 10 per cent. allowance, and £3473 19s. 5d. the net amount which he estimated as capital properly expended or incurred by the Company otherwise than out of revenue—making his final figure £49,673 19s. 5d.

In cross-examination, witness said the works were good; but new ones would be required in ten or fifteen years. He had given nothing for excess works, unless they were more than equal to the maximum day's make of 342,000 cubic feet. If the small mains ran out of the larger ones, and were carried along to the houses for their service, they would be service-pipes. If the mains in respect of which he allowed £309 were new ones laid for new supplies, instead of being replacements, this figure ought to go. The multiplier of 25 years' purchase depended entirely on the security; and he thought it represented the worth of the security in this case.

Wednesday, Nov. 22.

Mr. LITTLER said there had been some question as to what would happen if the Council were not ready to take the concern over on Jan. 1 next. It had been agreed that when the transfer day arrived the Company would render an account of the stores they had in hand (a local gentleman, say, to be called in in case of difference of opinion arising); and the Council would pay for those independently of the award in the arbitration.

Mr. BALFOUR BROWNE: That I am sure is the right course; and I am perfectly willing to accept my learned friend's undertaking.

Mr. *Alfred Colson* said it was very unfortunate that, in rebuilding the works, a more suitable site was not selected—one of greater area, with direct railway communication, and one so far removed from dwellings that all risk of complaints as to nuisance would be avoided. The recent expenditure of money by the Company was fairly proper, having regard to the situation and area of the works. The retorts were all heated by regenerator furnaces; but greater economy of working would be obtained by smaller units. The old retort-house decidedly ought not to be maintained. Both house and retorts should be demolished, and the new retort-house extended when more carbonizing power was required. There was a great preponderance of small mains. Three-inch mains should be substituted for the 1-inch and 1¼-inch ones, which would cost about £1200. He had prepared a table showing what the net profits would have been from 1894 to 1898 if the proper amount had been expended on repairs and renewals. According to the reconstructed tables prepared by the Accountants, the maximum dividends had not only been paid by the Company for years past, but a substantial surplus profit earned. In those years, however, the cost of repairs and maintenance of works, mains, services, and meters was far below what was generally accepted as a fair and reasonable charge under these heads. The proper charge should be 5½d. per 1000 cubic feet sold; and if this figure were applied to the sale, instead of there being a surplus income, there would have been a deficiency, except in 1898, when there would have been a small surplus of £78. In other words, the plant had been sadly starved

in all those years, and had proportionately run down; so that a large expenditure became necessary at the end of the time so as to maintain the works and earn the dividend. Generally, in order to value a gas undertaking, he took a year's accounts; but here it was impossible, and calculations had to be based on the half year to June last. It was not fair, as had been done on the other side, having regard to the increase that took place in that half year, compared with every previous similar half year, to add 15 per cent, when the half year's income had been doubled, in order to ascertain the year's working. Under the circumstances, the fairest way would be simply to double the figures for the first half year, after they had been corrected. In considering this half year, it should be recollected that the new plant was brought into operation in November, 1898; so that the half year had had the benefit of the maximum results obtained from the new works. One of the advantages thus derived was in the make of gas per ton of coal carbonized—viz., 9950 cubic feet, against an average of 8649 feet for the previous five years. The corresponding figures of sale were 8788 cubic feet and 7550 feet respectively. The unaccounted-for gas also showed a reduction of over 2 per cent. as compared with that of the previous year, which was remarkable having regard to the comparatively high pressure maintained at the works. The cost of repairs and maintenance in the half year was 1·84d., which was 3·66d. less than his figure of 5½d., which worked out, on the quantity sold for the half year, to £449. Witness then handed in a table showing the legitimate surplus profit for the half year under review. He started with the profit of £1855 19s. 11d.; and after making various adjustments, and allowing for dividends on called-up capital and other charges on the concern, he made the balance for the half year £223 16s. 8d., or for the year £447 13s. 4d. On this basis, he considered the maximum dividends fairly well assured. In this calculation, he took the price of gas as 2s. 11d.; but he questioned very much whether the Local Authority would be able to maintain that rate. In his valuation, he commenced with the maximum dividends payable (£1680), which he capitalized at 25 years' purchase. This produced £42,000. He held that an investment about equal in security to this Company could be obtained to pay fully 4 per cent. To this he added the 10 per cent. allowance (£4200) and £3271 capital expended by the Company beyond the authorized capital, and not provided out of revenue—giving a total of £49,471. In determining the latter figure it was necessary to decide what proportion of the capital expended beyond the authorized capital was for renewals, and what was for additional plant and apparatus. As he understood the clause, it was intended to secure to the Company, beyond the award in respect of their dividends, a further sum to meet any liability incurred in connection with capital expenditure above their authorized share and loan capital. In other words, the Company were to be compensated for the money spent and represented by tangible assets; but for none properly chargeable to revenue. In this case, seeing that down to the end of June, 1898, the capital raised and expended stood at the same amount, no question could arise on this head prior to that date. He handed in a table regarding the overspent capital, in which he added together £11,961 5s. 2d. the total amount expended in the year ended June last, £2794 10s. 6d. the sum expended to Oct. 31, 1899, and £790 still to be paid on incomplete contracts—making £15,545 15s. 8d., from which he deducted £2334 balance of capital authorized and paid up, and £4750 the amount of the mortgages, leaving £8461 15s. 3d. From this, however, he subtracted the following sums in respect of plant discarded: Retort-house £1160, retorts £870, purifiers £600, purifying-house £750, condenser and scrubber £1200, exhauster £300, and allowance for mains £310—£5190. This left the final figure of £3271.

Cross-examined by Mr. Balfour Browne: As to the unfortunate position of the Company, he agreed that the works had been there for years, and whatever was unfortunate in them would be represented by the working of the Company. In an ordinary case of purchase, apart from any special clause, if he found deficiencies he would say the revenue could not be earned unless the deficiencies were made up. If there were anything in excess of what was needed to earn the revenue, he would allow for it if the company was non-statutory, but not if it was statutory. With regard to his figure of 5½d. for repairs, his own works, where the figure was 4·84d. for 1898, were not scamped; but there was a large proportion of new work. Moreover, it was ridiculous to compare Leicester with a small place like Skipton. From Midland and Yorkshire coal a little over 10,400 cubic feet of gas per ton should be obtained; if only 9800 feet was secured there would be room for improvement. The multiplier of 25 depended entirely on the security.

Re-examined: His estimated balance for the half year was £224. A rise of 1s. 4d. in coal would wipe all this out. Coal had increased; and doubtless they would have to pay more for it next year than this. All gas companies would be effected; and he saw no chance of a corresponding rise in residuals, so that the incomes of gas companies generally were bound to be reduced next year. Wages also had gone up, and were still rising; and materials generally were increasing—especially iron.

By Mr. Woodall: The Company could raise their price; but it would be very unwise to do so, if it could be avoided. He doubted whether the Council would be able to maintain the 2s. 11d., because when gas undertakings were transferred to local authorities there was usually an immediate call for a reduction.

Mr. *John Waugh* said in February, 1898, he was consulted by the Council regarding the acquisition of the gas-works; and he made a report on March 12, 1898. To this report he in the main adhered. In it he gave a detailed description of the works, which he generally condemned; among his conclusions being that the making capacity was exhausted, that an entirely new purifying and cleansing plant was required, that the storage capacity was barely ample, and that the mains as regarded capacity for distribution were simply disgraceful, the relaying of a large portion being most urgent, but not contemplated in the expenditure which the Company were then undertaking. A large proportion of the new works would lie idle for years. Witness was also examined in some detail regarding the new works, which he criticized adversely. On the question of the probability of the electric light affecting the gas concern, he said the general tendency among manufacturers was to go in for electricity. At Horrock's Mills, near Preston, they had a gas-works of their own, but were now doing away with it, in favour of electricity. He knew of other similar cases where electric installations were being put in. Where the mills were confined, this was done for sanitary reasons. Her Majesty's inspectors were bringing very gentle pressure to bear upon this point. However, at mills they very often had surplus power, which was an additional reason for going in for electricity. The English Sewing Company at Skipton had already 1168 electric lights; and it was fair to infer that generally these works would put down their own installations. His valuation totalled £48,310; being 25 years' purchase of the maximum dividends, less £2400 which he estimated as necessary to bring the works into line, in order to earn and maintain the maximum dividends. Then he added 10 per cent., as directed by the Act, and £4750 the amount by which the Company were indebted to the bank on mortgage.

Cross examined by Mr. Balfour Browne: The works were too good for Skipton. Too great an expenditure for the place had been made, and the capital would be dead. He said in his report, and it was his opinion now, that the Company had neglected their duties in allowing the works to sink into their then state, and in not going to Parliament before to help them out of their difficulties by giving them extended powers as regarded capital. They were about the most abandoned gas-works he ever saw.

This closed the evidence.

Mr. Littler, in addressing the Court for the Council, said the matter would be one of great simplicity, but for the way in which the claim was formulated. What was the proper amount to be allowed for capital expenditure and the number of years' purchase, were things which could be easily dealt with; but complication arose over the extravagant claims for the capitalization of a sum which had only just been expended, and for the conversion of the mortgage debt into shares. As to the claim to convert the mortgage debt into shares, he held, first, that they could not do it legally; and, secondly, that if they could they dare not. It was not an asset which was of the least possible value to them. In the preamble of the Act, were the words: "And whereas the Company have borrowed on mortgage of their undertaking, and now owe the sum of £4750." Then clause 13 said the mortgage debt, if any, of the Company, and the interest thereon, should, after the transfer of the concern, be a first charge on the gas undertaking of the Council. Therefore the mortgage debt was £4500; and the words "if any" were put in by arrangement before the Unopposed Committee, because those representing the Company could not tell whether there was a mortgage debt or not. In these circumstances, it was absolutely impossible to convert the mortgage debt, seeing that it was to become a first charge on the concern. There were some remarkable circumstances here. Surely nobody ever heard of a conversion of, or of an attempt to convert, a mortgage after the matter had been discussed by a Parliamentary Committee. The agreement in Committee was come to on April 26. On May 20, the Company gave notice that they were going to hold a meeting for the purpose of conversion, and were promptly informed by the District Council that if that were persisted in questions would be raised, as they might still have been raised, before a Parliamentary Committee; and that an injunction would be applied for. The result was that the proposal was withdrawn. Then, on July 13, came the notice to treat. If there was one thing clearer than another, it was that what the Council were buying was the undertaking as it existed at the date of the notice to treat; and then the debt was not converted. Section 5 of the Act said all the debts of the Company other than the mortgage debt, if any, of the Company, at the date of transfer, were to be discharged by the Company.

The Umpire: How did it come about that there was any doubt as to the mortgage debt?

Mr. Littler: Because up to a certain period the money had been merely borrowed from the bankers. In our Bill, as introduced, there was no recital in the preamble as to debt at all, because we did not know of one.

The Umpire: It was strictly and legally a mortgage debt?

Mr. Littler: We did not know whether there was a mortgage debt or not, because it did not appear on the accounts. Continuing, he said it was when the Company introduced their Bill, in which they stated they owed the £4750, that the Council amended their Bill. Then when the parties went before the Unopposed Committee, the Agent for the Council's Bill asked the Agent for the Company if he knew anything about the mortgage debt; and as he did not, the words "if any" were put in for precaution's sake. If the Company's Bill had passed, he admitted that legally they would have had the power, under section 56 of the Companies Clauses Act, to have converted the money. But the Bill did not pass. Therefore, he contended, the whole intention of Parliament, and of the agreement between the parties, was that the Council were to pay off the mortgage debt. Under section 15, it was clear also that the Company were not to do anything except maintain the works and properly conduct the undertaking. Further, it was provided in the Act that the Council might borrow for the purchase of the undertaking; and then—the mortgage debt being no part of the undertaking—power was further given to borrow for the payment of the mortgage debt. This he held was a conclusive answer, in law, to the proposal as to conversion. What did they find with regard to the proposal, as a matter of fact? They found that the Company having had since 1863 the borrowing powers in question—although no doubt the money had been advanced, and they were under an obligation to the bank, which could be enforced, to execute a legal mortgage whenever called on—did not execute a legal mortgage until May 20, 1899. Up to that time, there was nothing which they could convert, because there was no mortgage in existence. The Company called a meeting to sanction the conversion; but the meeting decided that they would raise the money by mortgage. How, therefore, could it be said there was any right to convert? The Company did not raise money on mortgage, because if they had they would have had to pay interest on it; they did not raise it by shares, because then they would have had to pay dividend to the shareholders. Instead, having an Act which compelled them to reduce the price of gas as soon as they passed maximum dividends, they proceeded to do that which was capital work out of income; thereby making the consumer pay for it. Having regard to all the circumstances, could it be supposed they would ever have dared to have played such a trick on the consumers as to make this conversion? In that case, was this anything more than a bare power of no value? The privilege was worthless—one they could never have utilized, and one for which they were entitled to no consideration. This conversion was put at £185 per annum, which was multiplied by 30·77 years' purchase, producing about £6000; and then Mr. Stevenson added 10 per cent., as though it were property. Did one ever hear of allowing 10 per

cent. on a matter of mere right, and not of property? He agreed that the full 10 per cent. was to be allowed. There had been negotiations between the parties, from which it might be urged that they were willing sellers; and in order to get rid of this, the full 10 per cent. was allowed. The clause, having stated that the Company should sell, and the Council purchase, the undertaking, went on to say that, in the arbitration, the arbitrators should have regard to any capital properly expended or incurred by the Company otherwise than out of revenue, beyond the amount of share and loan capital authorized by the Act of 1863. The undertaking was that on which they had lawfully expended capital. But every atom of this expenditure since 1898, with the exception of so much as could have been met by the unissued authorized capital and by the authorized borrowing powers, was absolutely illegal, and was not, and could not be, part of the undertaking. The shareholders had no right to spend money improperly; and if they did, they ran the risk of having it confiscated when they next went to Parliament. But for this provision, as Mr. Balfour Browne told Parliament, they could not have asked for a halfpenny before the arbitrators in respect of this unauthorized capital. The Company came *ad misericordium*, and said: "If we do not get this money authorized, we shall lose it all." The Council said, in effect: "We will provide that what you have laid out shall not be confiscated. We will buy the undertaking, pay 10 per cent. on the value of the undertaking, and then, *plus* that, the arbitrator shall have regard to any capital properly expended or incurred." The section was as moderate as it could be—the words were not even "shall allow in full." The arbitrators were not bound to allow the whole it, or to do anything more than consider how much they would allow. He asked them to take the Council's figures; but they had no power to give 10 per cent. on this money for the reason that this was a subsequent provision. A portion of the money had been expended recently—he referred to the expenditure on the station meter—on which even Mr. Stevenson did not add 10 per cent. Why should any difference be made between that and the other expenditure, seeing that they were in exactly the same category, except that one was a little later than the other? The unauthorized capital was put at a sum on which Mr. Stevenson reckoned the interest to be £563, which, at 30 years' purchase, with the 10 per cent., made £19,000. Mr. Stevenson thought it just and reasonable that, having deliberately and wilfully committed an illegal act, and the Council having agreed to allow them something which was due to them, that this something should be made capital, and be put at the rate of 7½ per cent. But 7½ per cent. was never allowed now. The rate of interest was never put at more than 7 per cent.; and on unauthorized capital, if recognized at all, it was very often put at 4 or 5 per cent. This capital was unauthorized at a time when, if the Company had gone to Parliament, they would have certainly been put under the auction clauses, which would have reduced the percentage, if the concern were so magnificent, to 3½ per cent. Yet it was put at 7½ per cent. Regarding the large multiplier of 30 odd years' applied by the Company's valuers, he asserted there was no justification for it, seeing that it was matter of common knowledge that more could be obtained for gas shares than would bring in to the purchaser 4½ to 4¾ per cent., which would give a much smaller multiplier. Council briefly criticized the evidence, and, in conclusion, asked the Umpire to make his award (unless he concurred in Counsel's view) in such a form as would allow the questions of law to be discussd.

Mr. Balfour Browne, replying for the Company, said be founded his claim to the right to convert on the words of section 3. The undertaking of the Company included all its rights, powers, and privileges; and they had the right, power, or privilege to raise £4750 by shares instead of by borrowing. Then, under the Companies Clauses Act, they possessed at the date of the notice to treat the right—the absolute right—to raise the whole of the money by shares, on which they could have paid dividends. The whole scheme of the Act was that the mortgages might be paid off. The preamble said: "Whereas the Company have borrowed on mortgage of their undertaking, and now owe, the sum of £4750;" so that it was known to Parliament that the Company had borrowed the money. Then all through the Act where "mortgage debt" was mentioned, the words "if any" followed. What was the meaning of this if they could not convert? Who was going to pay the debt off in the meanwhile, if the Company were not? It was clearly in the contemplation of Parliament, therefore, that at the time of purchase there might be no mortgage debt. How was it to be got rid of? Only under section 56 of the Companies Clauses Act. The right was a valuable one; and he measured it by what they intended to do, and would have done, but for the action of the Council. Turning to section 5, if the money spent was merely to be paid back to the Company, there would have been words to that effect in the Act, and it would not have been left to the Court. The only way in which they could "have regard" to capital expenditure at all, was as revenue earning matter. If capital could earn no revenue, it had no value as capital. It was not right to suggest that the sliding-scale and auction clauses would have been put on the Company as the price of getting the power to treat this capital as the Company suggested. The section itself contemplated that the new capital was to be put in the same category as the capital of the Act of 1863; for it said "beyond the amount of share capital authorized by the Act of 1863." There was no question about authorized capital being treated as if it had been under the Act of 1863. It would have made no difference in the end on what basis the other capital was put, except that they would have had to deal with it upon the basis of standard prices. If the Company had had a sufficient and fair standard price, it would practically have put it on a lower figure as to the £7000, because it would have been raised by auction clauses; and therefore it would have been raised £4000 as principal, the rest being premium bearing no dividend, so that there would have been loss on that. But both the 7½ and the 9 per cent. stock would at once have risen. It was, however, all too speculative for a calculation of this kind to be made in the valuations. There had never been a clearer section than this, the effect of which was that they were to put the unauthorized capital, if they found it there and earning dividend, in the same category as the authorized capital, and treat it as 7½ per cent. capital. Mr. Littler had said they dare not do it; but most undoubtedly they would have done it, but for the fact that they would have probably lost the benefit of this special clause, in consequence of the opposition of the Council. Regarding Mr. Valon's valuation, he said there never was a more extraordinary or fantastical calculation put before an arbitrator. The question all arose on the deductions. In arriving at the capital expended beyond the authorized amount, Mr. Valon deducted allowances for old works and plant thrown out of use, or to bring the plant to an efficient condition for the manufacture of the daily maximum of 342,000 cubic feet of gas. But this was a revenue consideration, and had nothing to do with capital. Having referred to other items in the valuations, he dealt with the question of the number of years' purchase; suggesting that the figure of 25 was ridiculous in this case, and asking the Court to say that the revenue was so well secured that the Company were entitled to the very best multiplier that could be adopted. In conclusion, the learned Counsel pointed out that the valuation of the Council's valuers did not come to more than the structural valuation of the Company's witnesses, which struck him as being very peculiar.

It was agreed that the transfer should take place as from Jan. 1 next; the stores in hand to be taken over at a valuation.

The proceedings then terminated.

THE STRIKE AT THE GLASGOW CORPORATION GAS-WORKS.

Eight of the Strikers Fined—Proposed Conciliation Board.

The only development of consequence during the past week in connection with the strike which took place at the Dalmarnock and Tradeston Gas-Works of the Glasgow Corporation on Sunday, the 19th ult., consisted of the prosecution of eight of the men's ringleaders before Sheriff-Substitute Boyd, in the Sheriff Summary Court, on Friday last, when, as will be seen by the report in our "Legal Intelligence," one was fined £7 and the others £5 each. Continuing our record of the strike from the account given in the "Glasgow Herald," on Monday last week, Mr. Burgess, the Acting District Secretary, submitted the following letter to the Gas Commissioners:—

Gentlemen,—On behalf of the National Union of Gas Workers and General Labourers, I am instructed to submit proposals for the establishment of a Board of Conciliation and Arbitration for the regulation of wages and working conditions in the departments of Corporation employment under your control and management. My Executive has drafted the following suggestions:—

1.—That the representatives of your employees be two workmen from each of the gas-works at Dalmarnock, Tradeston, and Dawsholm, one workman from the Street Mains Department, and one official from the staff of the Union.

2.—That the representatives of the Corporation be seven members of the Gas Committee and one official from the Gas Engineer's Department.

3.—That the Lord Provost for the time being preside over the meetings of the Board.

4.—That the Board meet annually to determine the rates of wages and conditions of labour for the subsequent twelve months; the annual meeting to take place at least two months before the agreement under which the men are presently working terminates.

5.—That in the event of a difference of opinion arising as to the interpretation or faithful performance of the conditions of the agreement entered into at the last preceding annual meeting, and the respective officials of the Gas Engineer's Department and the staff of this Union cannot mutually compose such misunderstanding, either party may call a meeting of the Board on giving fourteen days' notice.

On the following day, the "Glasgow Herald" published a leading article on the subject; and to it Mr. Burgess replied, in the columns of that newspaper, on Thursday, in the course of which he said—

In a leading article in to-day's issue, you throw all the weight of your great influence into the scale against the acceptance of our proposals of arbitration and conciliation by the Gas Committee of the Glasgow Corporation. Assuming that your advice be followed—and it jumps so well with the prejudices of the majority of the members that that is more than probable—what advantage will the Corporation or the citizens have gained? It is easy enough to reckon the losses sustained. First, there will be a lamentable falling off in the confidence of the working classes in the good faith of their public advisers. Arbitration and conciliation instead of strikes have been preached, in season and out of season, from platform, pulpit, and Press. They have not been preached in vain. The appeal to reason rather than to brute force has triumphed. Trade Unionists have been educated into a conception of the fact that they can gain all to which they are entitled by sober argument and constitutional means. In these circumstances, it comes as a shock to find those who have urgently advised Trade Unionists to adopt these wiser methods of procedure helping to slam the door in their faces. I submit that this loss of confidence in the good faith of our Press and public representatives ought not to be lightly incurred. But we know it is easy to accept a principle, and to deny its applicability to particular circumstances. Those who endorse arbitration and conciliation in general may hold the opinion that arbitration between a powerful Corporation and a Trade Union of gas workers and general labourers would be *infra dig.* Therefore you, who no doubt uphold arbitration in the abstract, "invite the members of the Gas Committee to reflect whether it is competent and proper for the Corporation of Glasgow to give a status to such an organization as this by entering into an agreement of any sort with its representatives and officials." If you will permit me to say so, such advice is neither wise nor dignified. The status of the Gas Workers' and General Labourers' Union of Great Britain and Ireland, with its 45,000 financial members, the majority of them Corporation employees, does not depend upon the recognition of the Corporation of Glasgow. If by ignoring the Union the Corporation could annihilate it, there might be some force in your advice. But the Union, without Corporation recognition, in six months has established ten branches in Glasgow, with 2000 members, the majority servants of the Corporation. Recognized or not, the Union has come to stay; and if its activities are dammed into the old channels when it is aspiring to conduct its operations in the light of day, it will not be competent for you or for others to complain hereafter. I have no desire to utter anything in the nature of a threat; but I must state the obvious truth. Only those who have experienced it know how difficult it is to keep a class of labouring men like those employed at the gas-works well in hand. If we, the Union officials, are met respectfully by the Gas Committee, then the men will respect us also, and they will follow our advice, and in those circumstances we can promise that nothing of an irregular character would ever occur. There would be no spontaneous *émeutes* like that at Dalmarnock. If, unhappily, it were ever deemed advisable to discontinue work, it would only be after due notice had been given. More than that it is impossible to promise. More than that no employer, not even a Corporation, has a right to ask.

BIRMINGHAM CORPORATION GAS SUPPLY.

Interesting Notes from a Report by the Committee.

The Birmingham City Council will to day receive a report from the Gas Committee which contains the following noteworthy features :—

In the first place, the Committee state that they have had to postpone for the present the construction of all ironwork in connection with the extension at Nechells and with additions to plant at Windsor Street which is not immediately pressing, but which they would in more favourable circumstances have completed before the present winter. Many of the firms invited to tender for such work have declined, on the ground that they would be unable to obtain iron and steel for it within the time required for its completion ; and in some cases where tenders have been received, they have been much in excess of the value of the work to the department. The Committee have also had very considerable difficulty in obtaining the bricks required for the completion of the arches in the new retort-house ; but in order to prevent, as far as possible, the delay which would otherwise have occurred with this portion of the work, they have purchased supplies outside the contracts for the year.

The Committee regret to report the failure of one of the gasholders at Swan Village, occasioned by sinkings due to former mining operations in the neighbourhood. On inviting tenders for the necessary repairs, it was found that it would be impossible to get the work completed in time to bring the holder into full use in the present winter. The necessary steps have been taken to make one lift of the holder available until the required repairs can be undertaken in the spring; and the Committee have authorized an expenditure of £1675 in laying a connecting-main to the carrier mains to Wednesbury and Darlaston, from the large holder used to supply a portion of the Birmingham district. This main will be available to supplement the supply to those mains in case of necessity.

With the consent of the Finance Committee, the Committee have given instructions that the absence of army reserve men who have been called up to active service from the employment of the department, and who have been in such employment for periods of three months or upwards, shall be treated, for the purposes of the Superannuation Scheme (Parts I. and II.), as absence on leave. The Committee have, after inquiry into the cirumstances of the families of these men, made such weekly allowances to them until further notice as appeared to be desirable, after taking into consideration the army pay and allowances made to the families, and also the weekly allowances which are being liberally made by their fellow workmen. In making these allowances, the Committee have thought it advisable to guard against the total sum granted from the different sources being greater than that which the men have been accustomed to earn. They have with this object informed the officers of the Reservists' Relief Fund of the assistance given to these families. The Committee have also provided that, out of the allowances made, any weekly contributions which these men have made to the Superannuation Scheme (Part I.), or to the Sick and Funeral Allowance Society, shall be maintained.

The Committee have made the necessary contracts for coal required during the present year. While they have made these purchases without having to pay the whole of the advance demanded by coal owners, the increase in price is a serious one, and will have an important effect on the financial position of the department for the year. Having regard to the increasing demand for coke and breeze, and to the much higher prices which have now to be paid for coal, the Committee have, since their last report, twice raised the prices of these residuals. The demand for them still continues to be far greater than the supply.

The attention of the Committee having been directed to the small-power gas-engines which are being introduced by various manufacturers, they have had a selection of these engines tested at the works, and, in conference with the manufacturers of them, have arranged for their sale by the department on the three-years' purchase system. The Committee have made further contracts with gas-fitters trading in the town for the fixing of prepayment meters. They are now receiving the assistance in this work of nine firms, and will, as opportunity offers, add to the number. Although the work of fixing these meters was practically cleared at the end of August, large arrears have since accumulated ; and there are now about 1000 applications requiring attention. The total number fixed to Oct. 31 is 7938. With them 1269 cooking-stoves have also been issued. The fact that these have cost more in maintenance than ordinary stoves do, and tended to further reduce the small profit obtainable on the gas supply in connection with the prepayment system has also cost the Committee a great deal of time in consideration. To meet the difficulty, they have now prepared a specification of prices of stoves and moveable portions for replacement.

THE LONDON COUNTY COUNCIL AND THE WANDSWORTH AND PUTNEY GAS COMPANY.

The Magistrate's Decision in the Building Act Case to be Appealed Against.

At the Meeting of the London County Council last Tuesday, the Building Act Committee presented the following report upon the proceedings taken, under their instructions, against the Wandsworth and Putney Gas Company, in respect of the erection of a purifier-house in contravention of the provisions of the London Building Act, 1894, as reported in the "JOURNAL" for the 21st ult. : "The Wandsworth and Putney Gas Company having erected at their premises in North Street, Wandsworth, a purifier-house with a frontage on Waterside and Worple Road, at less than the prescribed distance from the centre of the roadways of such streets, a notice was, by our direction, served upon the Company, under section 6 of the London Building Act, 1894 (Amendment) Act, 1898, requiring them to set back the external walls of the building the prescribed distance. This the Company declined to do, and proceedings were accordingly taken to enforce compliance with the notice. At the hearing of the summons, evidence was given on behalf of the Company that it was absolutely necessary, in order that the Company might carry on their business, that they should have the purifier-house in the position in which it had been erected ; and it was contended that the Company were within their rights, and that the case came within the provisions of section 205 of the London Building Act, 1894, as by the Company's Special Acts they were empowered to erect such gas-works, whether for the manufacture, storing, or supply of gas or otherwise, as they thought fit, upon lands mentioned in the schedules to those Acts. In support of this contention, Counsel for the Company cited the following cases : *London and Blackwall Railway Company v. Limehouse Board of Works*, *London County Council v. School Board for London*, and *City and South London Railway Company v. London County Council*. The Magistrate decided, on the evidence before him, that the land upon which the building was erected was identical with that mentioned in the schedule to the Company's Act of 1880. He also stated that, had it not been for the authorities cited, he should have taken the view for which the Council contended, that the Company were not exempt from the provisions of the Building Acts. But he felt that the authorities were binding upon him on that point; and he accordingly dismissed the summons, allowing the Company £10 10s. for costs. But he expressed his willingness to state a case, if the Council desired to take the opinion of the High Court. It will be remembered that in a somewhat similar case last year, in which proceedings were taken against the South Metropolitan Gas Company, a different view was taken by another Magistrate, who decided that the Gas Company could not claim exemption from the provisions of the London Building Act, 1894, either by virtue of their Special Act or because the land upon which they had built was their own curtilage. We think it desirable that a decision of the High Court should be obtained upon the point; and we therefore recommend—' That the Solicitor do take the necessary steps for getting a case stated by the Magistrate with reference to the building erected by the Wandsworth and Putney Gas Company at their premises at North Street, Wandsworth, at less than the prescribed distance from the centres of the roadways of Waterside and Worple Road, and for obtaining the decision of the High Court upon the matter.'" The recommendation was adopted.

GAS-WORKS EXTENSIONS AT NEATH.

In order to meet the increased requirements of Neath, it was found necessary to make considerable extensions at the gas-works, comprising a new retort-house, a gasholder with steel tank, a tar and liquor tank, exhausters, two Cornish boilers, &c. ; and on Friday, the 24th ult., some members of the Corporation and a number of friends, among whom were the Engineers and Managers of gas-works in the neighbourhood and elsewhere, accepted the invitation of Mr. Hopkin Jones, the Chairman of the Gas Committee of the Neath Corporation, to inspect the premises and the various new appliances. The party were conducted by Mr. Jones, assisted by the Gas Engineer and Manager (Mr. R. A. Browning, Assoc.M.Inst. C.E.), who furnished a great deal of information which showed that the works had been brought quite up to date. The retort-house is 100 feet long and 46 feet wide, covered with an iron roof, and designed to hold ten settings of retorts. Five beds only are at present completed, each containing eight retorts. The settings are constructed on Mr. Chester's generator principle; having a subway along the front of the bench, approached by means of an incline. The floor-line of the retort-house is 4 feet above the yard-level, to facilitate the discharge of coke into the yard ; and a railway siding runs into the building. A new reciprocating exhauster of the latest type, capable of passing 20,000 cubic feet of gas per hour, has been provided; and the old exhauster has been removed, and re-erected in the same building. The tower scrubber is 50 feet high and 8 feet diameter. The gasholder, which is constructed upon the Dempster improved Gadd and Mason principle, is erected in a steel tank upon a concrete foundation. The tank is 102 feet diameter by 25 ft. 6 in. deep. The inner lift is 97 ft. 5 in. diameter, and the outer lift 100 feet diameter—each lift being 25 feet deep ; and its capacity is 360,000 cubic feet. The top of the tank being about 15 feet above the ground-level, a steel platform has been formed round the upper edge, so that the guide-carriages, which are all on the outside, may be inspected at any time. This holder, which is the largest of the kind in Wales, attracted much attention. During its construction, a large centrifugal pump was kept continually at work, although the foundations, &c., were carried out without injury to the surroundings. An old gasholder, 60 feet diameter and 18 feet deep, was removed, and the reservoir converted into a tar and liquor tank, which is covered with steel girders and brick arches. The railway siding runs over part of this work. The plans for the extensions were prepared by Mr. Browning; and the contracts were entrusted to Messrs. R. & J. Dempster, Limited, of Manchester, and Messrs. Thomas, Watkins, and Co., Limited, of Swansea. The former firm were responsible for the whole of the ironwork, foundations for the gasholder and tank, exhausters, scrubbers, connections, retort-bench, and settings; and the latter for the buildings.

At the close of the inspection, the company assembled at the Castle Hotel, where, as the guests of Mr. Hopkin Jones, they partook of luncheon. After the loyal toasts had been duly honoured, Mr. Walter Whittington submitted that of "The Corporation," which was responded to by the Mayor (Alderman H. P. Charles) and Mr. Hopkin Jones. The latter, in an interesting speech, traced the development of the gas undertaking from its humble beginning. They had, he continued, to face electricity; and it behoved them to place an excellent supply of gas at the disposal of the ratepayers. This had been done; and now their works would bear favourable comparison with any of similar size throughout the country. He proposed "The Contractors," and referred to the excellent way in which they had carried out their work, which he said was a credit to themselves and to the town. The representatives of the two firms having acknowledged the toast, the Mayor proposed "The Gas Engineer and Manager ;" saying tha i n Mr. Browning the Corporation had an excellent Engineer, who had discharged his duties faithfully and well. Mr. Browning, in responding, said he had always endeavoured to do his duty; and if he had succeeded he had his reward. In submitting the toast of "The Officials of the Borough of Neath," Mr. Llewellyn pointed out that had it not been for the ability of the Gas Engineer, the Corporation would have had to pay, not only £15,000, but 7¼ per cent. in addition for expert work. Other toasts followed ; and the proceedings terminated.

FENTON GAS-WORKS EXTENSIONS.

Local Government Board Inquiry.

Acting for the Local Government Board, Mr. E. P. Burd held an inquiry at Fenton last Tuesday into an application by the District Council for a Provisional Order granting them further borrowing powers. The Clerk (Mr. C. Adderley) explained that the application was for additional powers to the extent of £15,000 in excess of those contained in the Stoke and Fenton Gas Acts, 1878 and 1883. The Act of 1878 enabled the Council to borrow £55,000, and that of 1883 £10,000. During the latter year the Council had borrowed £43,500; and the share of capital contributed by the Council to the purchase in 1878 was £42,500. By the award in 1883, the Stoke Authority paid to Fenton £16,166; and the amount borrowed by Fenton since that year was £22,500. The cost of the present plant, including land, new road, and extensions, was £38,666. Dealing with the requirements of the district, the Clerk stated that in the years 1884 and 1885 the make of gas was only 31,318,000 cubic feet per annum; now it was 75,179,000 cubic feet. To meet the additional make, new and enlarged mains had been put down. The cost of meters and stoves had since 1893 been met out of revenue; the total being £5080. Of this, £1255 was written off in 1894. Half the amount asked for was for a new gasholder, which was an absolute necessity; the daily consumption during some parts of the year being 400,000 cubic feet, whereas the present storage capacity was only 350,000 cubic feet. It was impossible to work with safety with less than an average storing capacity for at least thirty hours' consumption. Mr. F. H. Darwin gave details of the additional works required. These, with their estimated cost, were as follows: Gas tank and holder to contain 400,000 cubic feet, £7500; four purifiers, 25 feet square and 6 feet deep, £1500; new meters, £2500; other contingencies and incidentals, £1000—total, £15,000. There was no opposition.

WINDING-UP OF THE BRITISH GAS TRACTION AND PATENTS ACQUISITION COMPANIES.

Last Friday, an adjourned meeting of the creditors of the British Gas Traction Company, Limited, was held at the Board of Trade Offices, Lincoln's Inn—Mr. G. S. Barnes, Senior Official Receiver, presiding. The previous proceedings were reported in the "JOURNAL" last week (p. 1325). Messrs. Blyth, Dutton, and Co. attended as Solicitors on behalf of creditors. The Chairman said the meeting was adjourned on the last occasion in order that the creditors might have a complete statement of affairs laid before them. This had now been lodged, and showed unsecured liabilities amounting to £39,610, of which £32,896 was due to the parent Company. The assets consisted of tramway plant, &c., at Blackpool, Trafford Park, and Neath, valued at £12,000; machinery and materials, £1049; shares in the Blackpool Tramway Company, £640; the right to allotment of shares in the Traction Company of the United Kingdom, Limited, £25,000; a parliamentary deposit, £2184; and book debts, £10,141—making a total of £49,728. If the estimates placed upon the assets were realized, there would be a surplus of £10,118; and every creditor would be paid in full. Upon the motion of Mr. R. W. Wallace, Q.C., it was resolved to appoint Mr. Percy Holyoake, the Secretary of the Company, Liquidator. With reference to the Committee of Inspection who had been appointed, a representative of Lloyds Bank, Limited, was nominated on behalf of the creditors, and the Chairman stated that since the matter came into his hands, the Bank, who were mortgagees, had used every effort to preserve not only their interests, but also those of the unsecured creditors and shareholders. Mr. Wallace said it was suggested on the previous occasion that the parent Company should stand aside until the trade creditors had been paid; but he thought this was a matter for the consideration of the Committee. If a reconstruction scheme were carried through, the suggestion would be adopted. The proceedings then terminated; the hope being expressed that the Company might be satisfactorily reconstructed.

A winding-up order having recently been made against the Patents Acquisition Company, Limited, registered two years ago, with a nominal capital of £60,000, in £1 shares, to acquire a patent relating to a cold-current gas-burner, the statutory meetings of creditors and shareholders were held last Friday at the Board of Trade Offices, Lincoln's Inn—Mr. A. S. Cully, Assistant Official Receiver, presiding. The Chairman reported that the Directors were all more or less interested in the sale of the patent, inasmuch as they appeared to have assisted the vendor, Mr. A. T. M. Johnson, financially and otherwise, in perfecting it. They received certain shares from him, and subscribed for others. The consideration payable to the vendor was £15,000, which was discharged by the issue to him of fully-paid shares to this amount. Although these shares were duly allotted, the patent was never assigned to the Company. He did not know what reason the Directors had for issuing the shares without first obtaining a good title to the patent. The vendor now claimed a lien on the patent in respect of fees due to him as Managing-Director; but this claim would not stand. His salary as Managing-Director was £150 a year, and he was also to receive a percentage on the profits after the payment of a 10 per cent. dividend to the shareholders. The Directors were to receive £500 a year and a percentage on the profits. The fees were paid up to December, 1898, by the allotment to each of the Directors of 95 fully-paid shares; and the amount now due in respect of fees was £299. As a result of the issue of a prospectus in December, 1897, applications were received for £396 worth of shares; and this, with the seven shares allotted to the signatories to the Memorandum of Association, represented the whole capital of the Company. Very little business appeared to have been done; and a balance-sheet showed a loss on trading up to December, 1898, of £1155. Judgment was obtained against the Company in September last, under which an execution was levied and the goods sold. The statement of affairs showed liabilities to the amount of £1166, and the assets were valued at £2223, including £2000 in respect of the patent. As regarded contributories, there was a deficiency of £14,871. Both creditors and shareholders decided to leave the matter in the hands of the Official Receiver as Liquidator.

LIGHTING PROGRESS IN GLASGOW.

Mr. Robert Hamilton, the Inspector of Lighting for Glasgow, has his hands full of work, which has accumulated during a long and severe illness, from which he is only recovering slowly. The work referred to results chiefly from a desire on the part of the Watching and Lighting Committee of the Police Authorities to bring the Welsbach incandescent system of gas lighting into more extensive use in Glasgow. And yet there are on the streets something like 400 incandescent lights, one of which has burned more than 3000 hours with the original mantle still going. Mr. Hamilton's chief difficulty in the way of using the Welsbach light rests with the trouble resulting from the vibration of the mantle and the premature giving way of the latter, especially in the streets where there is a good deal of heavy traffic. But since the anti-vibrator has come into use, and has proved to be a workable appliance, there is less room to find fault with the mantle failing. With the anti-vibrator at his service, the Inspector of Lighting has resolved to fit up with incandescent gas-lamps two or three streets—Bath Street, West Regent Street, and West George Street; indeed, he has made a commencement with the first-named street, and is only awaiting delivery of lamps to go on with the remainder of it and with the two other streets. He has lately been supplied with fifty anti-vibrator lamps, on which he is making certain alterations to the anti-vibrator, so that the chimney may sit properly upon it; and he is proposing to provide against blasts into the lanterns by having small light glass globes fixed with chains internally, so that they will readily drop into the holes with which all the Glasgow lanterns are provided for introducing the lighting staff, and so exclude the blast on a boisterous night. The Inspector of Lighting has no objection to the incandescent lamp, but only to its greedy consumption of mantles. He has these lamps placed on several portions of the streets, or on whole lines of streets, and generally they are each provided with a bye-pass. But that is not a necessity; and the filling of the lighting-holes in the lanterns already alluded to may wholly remove any little troubles that have arisen from the bye-pass in the past.

It may be that later on the incandescent gas-lamp will render the electric arc lamp wholly unnecessary on the Glasgow streets. A few years ago there were about 100 arc lamps erected in the streets, chiefly in those which are traversed by tramway cars; and the frequency with which those lamps are non-effective, combined with the fact that Glasgow is so well provided with gas, may ultimately cause a change to be made. Of late there have been put up more arc lamps where electric trams have been brought into use, as on the Mitchell Street and Springburn line of trams; and it is the intention of the Tramways Department to have all the tram lines of the city and suburbs adapted to the electric system of working before May, 1901, when the International Exhibition is to open, in which case the arc lamp will be co-extensive with the city and its principal streets, if no revulsion of feeling should arise in the interim. The charge now made for the arc lamps is £18 per annum; but a conditional promise has been given by the Electricity Department to reduce the sum charged to £14 each when 400 additional lamps have been fixed up. There is no doubt that the streets where they have been installed are much better lighted than are the adjoining ones in which gas is used as the illuminant. But where the incandescent system of gas lighting is brought into use, it can be employed to give an equally brilliant illumination, and at much less expense. Still, the brilliancy of the light is the thing which dazzles the eyes of the ratepayers, or rather the persons who levy the rates. Later on, however, the event may arise that both payers and leviers of the rates will be able to look at the thing dispassionately, and see that the incandescent gas system of lighting the streets is one in which economy of taxation may be effected to considerable purpose, and the levying of the rates done with great effect.

GAS v. ELECTRICITY AT KINCARDINE-ON-FORTH.

The question of "Gas *v.* Electricity" has lately been under the consideration of the inhabitants of Kincardine, a little village, of about 2500 inhabitants, situated on the Forth, about five miles from Alloa. The place is scarcely one where an electric light undertaking would be likely to be successful, as, though it had at one time a fairly good shipping business, as well as shipbuilding works, its glory in this respect has departed, and it has now become a kind of resort for retired mariners. The village, however, possesses a good worsted-mill, as well as large rope and paper works, so that it is by no means a Sleepy Hollow. The gas-works were established more than half-a-century ago; but they appear to have been neglected of late years, with the result which invariably attends such policy. The make of gas, which a few years ago was 2½ million cubic feet per annum, fell to less than a million last year; and, consequently, the consumers complained of inadequate supply, and began to turn their attention to electric lighting, a scheme for furnishing which was very cordially received. The proposal was to establish a central station in the village, the motive power for the plant being supplied by engines worked by Dowson gas. It was intended to charge 7d. per unit for private, and 6d. per unit for public lighting; these charges being, it was asserted, equivalent to gas at 3s. 6d. and 3s. per 1000 cubic feet. This comparison, as Mr. Botley has lately shown the consumers at Hastings, and as those at Kincardine would doubtless have found out by experience, was altogether misleading; electricity having to be sold at 3d. a unit to be equal to gas at 3s., if consumed with proper burners. However, it is unnecessary to dwell upon this matter, as the inhabitants were saved from embarking in what might have been an unprofitable speculation by possibly a not altogether unexpected occurrence. A few weeks ago, the gas-works were offered for sale, and they were acquired by Messrs. J. Firth Blakeley and Co., Gas Engineers, of Thornhill, Dewsbury, who, we learn, purpose remodelling them, and putting the plant into a condition for furnishing gas of good quality at a reasonable price. The effect of the change in the ownership of the gas undertaking, and the assurance given that it would be conducted with more enterprise in the future, nipped in the bud the electric lighting scheme; those who favoured it being willing to give the new-comers a chance. Moreover, they probably found out, on going into the matter, that, light for light, the cost of electricity is frequently double that of gas. The

inhabitants of Kincardine would do well, before thinking about starting an electric light undertaking, to turn their attention to the paper read by their neighbour, Mr. A. Yuill, the Gas Engineer to the Alloa Commissioners, at the last meeting of the North British Association of Gas Managers. He showed that upwards of 14 million tons of coal were used, in the last year for which statistics were available, in the production of 140,600 million cubic feet of gas; the total units of electricity sold being estimated at 76,134,233. Now, 80 cubic feet of gas are generally considered to be equal to a unit of electricity; and this, multiplied by the total units sold, represents 6,090,738,000 cubic feet, equal to 4·33 per cent. of the total quantity of gas made per annum, or nearly the average annual increase in the gas companies' business. Another point worth their consideration relates to the capital required by suppliers of electricity in comparison with their output. A sum of £11,906,163 has been sunk for the production of 76,134,233 units of electricity, which are equivalent, as shown above, to 6,090,738,000 cubic feet of gas. Taking £500 per million cubic feet of gas made as the average capital expenditure for new works, the quantity of gas named could be dealt with by an expenditure of £3,045,369 by gas companies, as compared with the £11,906,163 laid out in connection with electric light undertakings. These figures may be left to speak for themselves.

GAS-WORKS EXTENSIONS AT LLANDUDNO.

Mr. T. W. Griffith, the Chairman of the Gas and Water Committee, submitted to the Llandudno District Council last Tuesday, a report recommending the acceptance of tenders for the immediate extension of the gas-works. He said that, notwithstanding the fact that the electric light had been introduced into the town, and was becoming very generally adopted for street lighting and business premises, there was a steadily-growing demand for gas; and the present plant was totally inadequate to meet this demand. The storage capacity was only slightly more than half the daily consumption of gas during the past season. The increased output of gas in the past month, as compared with the corresponding month last year, was 800,000 cubic feet; and in the previous month the increased consumption was over a million feet. These facts spoke for themselves, and amply justified the additional expenditure now contemplated. The Council had already approved of the proposal to erect an additional gasholder; and tenders had been invited. Of eight offers received, only three fulfilled the specified conditions; and of these three the Committee recommended the acceptance of that of Messrs. R. Dempster and Sons, of Elland, for £10,605. This tender provided for a steel tank, which, in the opinion of the Committee, having regard for the nature of the ground, was to be preferred to a brick tank—the difference in cost being estimated at £500. He moved the adoption of the report, including the acceptance of Messrs. Dempster's tender. The motion having been seconded, Mr. R. Conway, while not opposing the recommendation, did not think a steel tank equal to a brick one. Mr. W. O. Williams said the Committee had expert testimony to show that the life of a steel tank in damp ground, such as they had at the gas-works, was at least equal to that of a brick tank. The Surveyor (Mr. Stevenson) corroborated this statement, adding that the only weak point in the steel tank would be at the water-line, where the air and water met. Here it might be protected by a coating of cement. The recommendation was unanimously adopted.

ELECTRIC LIGHTING NOTES.

The Local Government Board have sanctioned a loan of £20,000 for electric lighting purposes at Wrexham. For dealing with one or more sections of the proposed works, 54 tenders have been received.

The business of the Court at the Glamorgan Assizes at Cardiff last Thursday afternoon was considerably handicapped by the vagaries of the electric light. On one occasion, when the light contracted to almost a pinhead, Mr. Justice Bucknill quite lost patience, and exclaimed: "Here's Cardiff, one of the largest towns in the kingdom. Is there no one in Cardiff who will stand up for the electric light?" The reporter has omitted to state whether anyone dared to.

A condition of things inconsistent with the dignity of the Northwich District Council prevailed at their meeting last Tuesday. The electric light failed; and the spectacle was witnessed of members rushing here and there for lights of a lower but more faithful order. The Chairman, wearing his gold and enamelled chain of office, was ushered into the chamber by the light of a tallow candle, a stable lamp was placed on volumes of the Public Health Act, and three tallow candles occupied coigns of vantage. The failure of the current also temporarily closed the electrical swing bridge, and plunged a number of shops in darkness.

The members of the Corporation of London had a varied experience with the electric light at their meeting last Thursday. The weather was of the kind usually expected in November—foggy and dark—and the electric light had to be brought into use. It began well, and seems to have held out during the discussion of a proposal to add another £100 to the salary of the Electrical Engineer (Mr. A. A. Voysey), which was agreed to; but about four o'clock it went out, and candles had to be resorted to. By the aid of this past-time illuminant, the rest of the business was transacted. It is curious to note at what singular times the electric light displays its unreliability.

A proposal to considerably extend the arc lighting of the streets is now being considered at Bristol; but it involves a very substantial addition to the bill for public lighting. The subject was reported upon by the Electrical Engineer at the meeting of the Corporation Sanitary Committee last Thursday. He stated that there were at present 306 arc lamps in use, for which £23 each per annum was charged; this charge including the first outlay on the pillar and fitting up. The annual sum devoted to street lighting for these 306 lamps was £7038. The present cables laid from the power station had a carrying capacity of 438 lamps, in addition to those already in use; so that it was possible to materially increase the number without laying fresh cables from the station. A list of streets that could be lighted in this way was submitted; and among them 394 lamps were distributed. With additions to the cables,

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 1367.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 13	10½	Alliance & Dublin 10 p. c.	21—22	..	4 15 5
100,000	10	,,	7½	Do. 7 p. c.	15—16	..	4 13 9
800,000	100	July 3	5	Australian 5 p. c. Deb. .	102—104	..	4 16 2
200,000	5	Nov. 15	6	Bombay, Ltd. . . .	5¾—6¼	..	4 8 11
40,000	5	,,	6	Do. New, £4 paid .	4—4½	..	5 6 8
380,000	Stk.	Aug. 16	12	Brentford Consolidated	273—278	..	4 6 4
270,000	,,	,,	9	Do. New . . .	210—215	..	4 3 9
50,000	,,	,,	5	Do. 5 p. c. Pref. .	140—145	..	3 9 0
159,375	,,	June 15	4	Do. 4 p. c. Deb..	126—130	..	3 1 7
220,000	Stk.	Sept. 15	11½	Brighton & Hove Orig..	250—260	−5	4 8 6
226,320	,,	,,	8½	Do. A. Ord. Stk. .	185—190	−2	4 9 6
973,500	Stk.	Aug. 16	5	Bristol, 5 p. c. max. .	125—130	..	3 16 11
420,000	20	Sept. 29	10	British	43½—44½	..	4 9 10
50,000	10	Aug. 31	12	Bromley, Ord. 10 p. c. .	25—27	..	4 8 11
75,000	10	,,	9	Do. 7 p. c. . . .	19—21	..	4 5 8
500,000	10	Oct. 13	6	Buenos Ayres (New) Ltd.	9¼—10	..	6 0 0
220,000	Stk.	June 29	4	Do. 4 p. c. Deb. .	100—102	..	3 18 5
150,000	20	July 13	8½	Cagliari, Ltd. . . .	28—29	..	5 13 10
100,000	10	Sept. 29	8	Cape Town & Dis., Ltd.	13½—14½	..	5 10 4
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	56—58	..	5 3 5
550,000	Stk.	Oct. 13	13½	Commercial Old Stock .	308—313	..	4 6 3
200,750	,,	,,	10½	Do. New do. .	240—245	..	4 5 9
200,750	,,	June 15	4½	Do. 4½ p. c. Deb. .	143—148	..	3 0 10
800,000	Stk.	June 15	9†	Continental Union, Ltd.	185—190	..	4 14 9
200,000	,,	,,	7	Do. 7 p. c. Pref. .	182—187	..	3 14 10
51,600	Stk.	Aug. 31	14	Croydon A 10 p. c. . .	335—340	..	4 2 4
168,400	,,	,,	11	Do. B 7 p. c. . .	265—270	..	4 1 5
555,000	Stk.	Aug. 16	5½	Crystal Palace Ord. 5 p.c.	130—135	..	3 17 9
60,000	,,	,,	5	Do. 5 p. c. Pref. .	140—145	..	3 9 0
486,090	10	July 28	11	European, Ltd. . . .	21½—22½	..	4 17 9
354,060	10	,,	11	Do. £7 10s. paid .	16—17	..	4 17 1
14,993,075	Stk.	Aug. 16	4⅝	Gas-light & Coke and Coke	4 p. c. Ord. . .	104—106	−1	4 12 5
2,600,000	,,	,,	3½		3½ p. c. max. . .	97—99	..	3 10 8
3,799,735	,,	,,	4		4 p. c. Con. Pref.	120—123	..	3 5 1
3,993,975	,,	June 15	3		3 p. c. Con. Deb.	99—101	..	2 19 5
70,000	10	Nov. 15	8	Hongkong & China, Ltd.	13½—14½	..	5 10 4
3,800,000	Stk.	Nov. 15	10	Imperial Continental .	220—225	..	4 8 11
473,600	Stk.	Aug. 16	3½	Do. 3½ p. c. Deb. Red.	101—104	..	3 7 4
75,000	5	June 15	6	Malta & Medn., Ltd. .	5—5½	..	5 9 1
560,000	100	Oct. 2	5	Met. of Melbourne	5 p. c. Deb.	110—114	..	4 7 9
250,000	100	,,	4½		4½ p. c. Deb.	108—110	..	4 1 10
541,920	20	Nov. 15	3	Monte Video, Ltd. . .	11—12	..	5 0 0
617,946	Stk.	Aug. 31	9½	Newc'tle & Gatesh'd Con.	220—225	−5	4 2 3
264,855	Stk.	June 29	3½	Do. 3½ p. c. Deb. .	106—109	..	3 4 3
60,000	5	Sept. 29	7	Ottoman, Ltd. . . .	5½—5¾	..	6 1 9
				*Ex div.			
150,000	5	Nov. 30	8	Oriental, Ltd. . . .	7½—7¾*	..	5 3 3
135,000	5	,,	8	Do. New, £4 10s. pd.	6½—6¾*	..	5 6 8
15,000	5	,,	8	Do. do. 1879, £1 pd.	1¼—1½*	..	4 11 5
500,000	100	Dec. 1	6	People's Gas of Chicago	2nd Mtg. Bonds .	102—106*	..	5 13 2
851,070	10	Oct. 13	7	River Plate Ord.. . .		11—11½	..	6 1 9
250,000	Stk.	June 29	4	Do. 4 p. c. Deb. .		100—102	..	7 8 2
250,000	10	Sept. 15	10	San Paulo, Ltd. . . .		12—13	..	7 13 10
135,000	Stk.	Sept. 15	10	Sheffield A.		247—249	..	4 0 4
209,053	,,	,,	10	Do. B.		247—249	..	4 0 4
447,427	,,	,,	10	Do. C.		247—249	..	4 0 4
5,600,000	Stk.	Aug. 16	5½	South Metrop., 4 p.c. Ord.		136—138	−1½	3 17 3
1,520,000	,,	July 13	3	Do. 3 p. c. Deb. . .		101—103	..	2 18 3
120,000	Stk.	Aug. 31	6	Tottenham and Edmonton	A. 5 p.c. B. 3½ p.c.	141—143	..	4 3 11
250,520	,,	,,	4½			102—104	..	4 6 6
55,100	,,	—	4		4 p.c. Deb..	115—120	..	3 6 8
182,380	10	June 15	5	Tuscan, Ltd.		9—10	..	5 0 0
149,900	10	July 3	5	Do. 5 p. c. Deb. Red.		98—100	..	5 0 0
				WATER COMPANIES.				
746,184	Stk.	June 29	11	Chelsea, Ord.		313—318	..	3 9 2
150,000	,,	,,	5	Do. 5 p. c. Pref. .		163—168	..	2 19 6
160,000	,,	,,	4½	Do. 4½ p. c. Pref. '75		145—150	..	3 0 0
175,785	,,	Sept. 29	4½	Do. 4½ p. c. Deb. .		150—155	..	2 18 1
1,720,560	Stk.	Oct. 13	7	East London, Ord. . .		202—207	−1	3 7 8
654,740	,,	June 29	4½	Do. 4½ p. c. Deb. .		152—157	..	2 17 4
390,000	,,	,,	3	Do. 3 p. c. Deb. .		101—103	..	2 18 3
700,000	50	June 15	7½	Grand Junction	10 p. c. max. .	110—113	..	3 6 5
310,000	Stk.	Sept. 29	4		4 p. c. Deb. .	133—138	..	2 18 0
708,000	Stk.	Aug. 16	14	Kent		353—358	..	3 18 3
160,000	,,	,,	7	Do. New, 7 p. c. max. .		208—213	..	3 5 9
1,043,800	100	June 29	10½	Lambeth, 10 p. c. max. .		298—303	..	3 9 4
406,200	100	,,	8	Do. 7½ p. c. max. .		225—230	..	3 9 7
350,000	Stk.	Sept. 29	4	Do. 4 p. c. Deb. .		136—140	..	2 17 2
500,000	100	Aug. 16	13½	New River, New Shares		428—433	..	3 2 4
1,000,000	Stk.	July 28	4	Do. 4 p. c. Deb. .		135—140	..	2 17 2
902,300	Stk.	June 15	7½	South-wark and Vauxhall	Ord. . . .	213—218	−2	3 8 9
126,500	100	,,	7½		7½ p. c. max..	193—198	..	3 15 9
489,200	Stk.	,,	5		5 p. c. Pref.	165—170	..	2 18 10
1,019,585	,,	Oct. 13	4		4 p. c. A Deb.	131—136	..	2 18 10
1,155,066	Stk.	June 15	10	West Middlesex . . .		298—303	..	3 6 0
200,000	,,	,,	4½	Do. 4½ p. c. Deb. .		152—157	..	2 17 4
200,000	,,	Sept. 15	3	Do. 3 p. c. Deb. .		101—103	..	2 18 3

† Next dividend will be at this rate.

other streets could receive 92 arc lamps; the total number now proposed making 486, in addition to the 306 at present in use. If the suggested extensions were carried out, the cost per lamp for those at present in use and the additional ones could be reduced to £19 per annum. The Inspector of Lighting reported that the number of gas-lamps now in the streets enumerated was 652; and the annual cost £2305. The present annual cost was thus: 306 arc lamps at £23, £7038; 652 gas-lamps, £2305—total, £9343. If the suggested extensions were carried out, the annual cost would be: 306 present arc lamps and 486 additional lamps, making 792, at £19, £15,048; deduct present cost, £9343; extra cost, £5705. Thus the addition of 486 arc lamps would cost £5705 per annum more than the present system, or about £11 15s. per lamp. The subject was referred to a special meeting of the Committee.

The Wimbledon District Council having applied to the Local Government Board for sanction to the borrowing of £22,000 for electric lighting purposes, the matter was recently inquired into by Mr. F. H. Tulloch, one of the Inspectors. The Clerk to the Council (Mr. W. H. Whitfield) stated that the original sanction in respect of the electric lighting scheme was for a sum of £32,000, based upon a report prepared by Mr. Preece in 1895. The work was not actually carried out until some three years later. Mr. Preece estimated that they might expect about 100 private customers. They had already, although their electric lighting system had been in operation but a very short time, 200 on the books. The estimate for this class of consumers was 3000 lamps, or equal to 5000 8-candle fixed lamps at one time. Their present customers required about 12,000 lamps. The Resident Engineer (Mr. F. B. Spencer), interposing, said the number was actually 12,825. The total number of lights applied for this year was equal to 9765 8-candle power lamps. Mr. Whitfield (continuing) said the scheme they now put before the Board provided for a total of 20,000 lamps. Coming to the question of public lights, at the time Mr. Preece prepared his original report there were 725 lamps in the district, equal to 925 lamps of 30-candle power. Mr. Preece estimated for 1000 32-candle lamps. There were actually existing lamps equal to 1200 of 32-candle power—an increase of about 25 per cent. This growth in the demand necessitated large additional expenditure; and this was the main reason for their application to the Board. He should also state that the original estimate—probably owing to the length of time which elapsed before the work was carried out—had been exceeded in some particulars. On the old work there was an increase of £300 on buildings, £1000 on machinery, and £550 on sundries, which included principally the cost of obtaining the Provisional Order. With regard to the new work, the new buildings required were estimated to cost £4000; extensions of machinery, £8000; meters, £550; and public lamps, £400. In addition to these items, there was a sum of £7200 for extensions of mains. The Electrical Engineer (Mr. A. H. Preece) then explained in detail the items of the proposed expenditure, and stated that they already had an assured income of more than £6000 per annum. They also estimated that, with all the lamps already connected, they would have a profit within twelve months. When all the lamps were set up, the income would approach £9000 per annum.

The Deputy-Coroner of Bradford (Mr. J. G. Hutchinson) has twice sat to inquire into the circumstances surrounding the death of Edgar Driver (aged 19), an electrician, who met with his death while engaged at Messrs. Isaac Holden's works at Bradford. At the first hearing, evidence was given to the effect that, while deceased was fixing wires for electric lighting, he slipped; and in order to save a fall, he seized an iron rod composing part of the frame running round an electric arc lamp, and supporting the lower carbon. Death followed almost directly. At the second hearing, Dr. Samuel Lodge, Police Surgeon, who had conducted a post-mortem examination, stated that, in his opinion, the electric force had been the cause of death, leading to a sudden stoppage of the heart. There was no charring or wound; but there was discolouration and very powerful contraction of the hands. Mr. C. R. Heaton gave evidence of tests which he had made, and which disclosed a leakage in the circuit. The fault was found to be due to a defect in the positive brush holder. The testimony of Mr. A. H. Gibbings, the City Electrical Engineer, was interesting. He stated that the terminals of the arc lamps were out of reach; but the framework of all the lamps conveyed the current to the negative carbon. These were quite exposed, and between 6 and 7 feet from the ground. The frame-work being in this position, it would be possible to obtain a shock from any of the lamps at any time by touching a lamp with the hand and establishing a connection with any pipe or metal work adjacent, if there were a leakage. This he considered an unsatisfactory feature; and there should be some rectification for the safety of the workmen. A leakage might occur at any time; and a person might receive a shock. It was evident the deceased, after clutching the arc lamp, came in contact, by his feet, with an ironplate beneath. The maximum voltage which he could have received was 225; and the highest voltage he had heard of from which a person had recovered was 2500. But he believed very much higher voltages had been received without serious ill-effects. The Coroner remarked that, with regard to the electric current generally, he supposed there were considerable latent dangers of which nothing very definite was known. Witness agreed, adding that apart from the question of high voltages, there was always the possibility of a shock similar to a severe mental shock. Up to the present, a pressure of 225 volts had not been considered dangerous. The result of the deliberations of the Jury was that they found deceased met with his death accidentally by an electric shock. They considered that some better protection should be made with regard to this type of electric lamp, and further advised that electrical installations should be periodically tested for leakage.

BIRMINGHAM CORPORATION WATER DEPARTMENT.

Last Summer's Drought—South Staffordshire Water Company and Existing Works—Progress of the Elan Valley Works.

In a report prepared for presentation to the Birmingham City Council, the Water Committee state that, at the beginning of the drought of the past summer, the demand for water largely exceeded any previous experience in the department; the distribution on certain days in the month of

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June being above 23 million gallons. The existing works not being capable of maintaining continuously a supply of more than 20 million gallons a day, it became necessary to adopt stringent measures to curtail the consumption. Notwithstanding the restrictions imposed, the quantity used during the weeks of drought after the issue of the notices against garden watering, &c., averaged 19¾ million gallons a day; and the consumption for the whole half year from April to September averaged 18¾ millions. In view of these results, the outlook for the next two or three summers is a serious one; and the Committee are considering means whereby additional temporary supplies may be obtained.

They also report that an application has been received from the South Staffordshire Water Company to open negotiations for the purchase of certain of the existing water-works of the Corporation after the arrival of the Welsh supply. The Committee have made a careful forecast of the probable demand for water, and have come to the conclusion that it will be advisable to retain, as an emergency supply, that part of the existing works of which the yield is satisfactory in quality, and which can be utilized without repumping at Aston. The retention of these works will probably enable the Corporation to postpone the provision of a third pipe on the Elan aqueduct for some years; and as the annual charge involved in the provision of each additional pipe will largely exceed the cost of retaining and maintaining the existing works, on all grounds their retention is desirable. The Committee have, therefore, informed the South Staffordshire Company that they are not prepared to part with the works in question.

Referring to the Elan Valley works, the Committee state that, the weather during the past summer having again been favourable to the operations, good progress has been made on the work at all points. The Brecon section of the Caban Coch dam is carried to a height of 732·5 feet above Ordnance datum; and the culvert is complete, with the exception of fixing the bell-mouth on the inlet. The Radnor section is carried to a similar height; and the culvert is complete. The river has for some months been passing through the Radnor culvert; and the middle section has been staked out, and excavation is proceeding in the bed of the river. With regard to the Gareg-Ddu submerged dam, it is reported that, with the exception of a small quantity of masonry near the left bank, the dam is complete; and the viaduct carried by the dam is in a forward condition. The right bank abutment has been completed, and five of the piers have been carried up to springing level. The remaining pier and the left bank abutment are well forward. Centres have been fixed for turning five of the arches; and it is hoped by the end of the year to be ready to turn the other two. The Pen-y-Gareg dam is now built across the valley up to a height of 882 feet above Ordnance datum—that is, 63 feet below the crest. The masonry at Craig Goch dam is completed to a height of 995 feet above Ordnance datum—that is, 45 feet below the crest. The portion of the aqueduct within the Elan Valley comprises the Foel tunnel and the Elan conduit. The tunnel has already been pierced; and preparations are in progress for lining it. The preparatory work for the construction of the Elan conduit is in hand. A contract has been entered into with Messrs. John Aird and Sons for the construction of the works under Contract 15. These consist of a covered service reservoir at Warley, to hold 1½ million gallons, with a cottage and other works adjoining, together with the provision and laying of about 14½ miles of cast-iron pipes, comprising, among others, the rising-main from the Frankley reservoir to the Warley reservoir, and distribution-mains extending from Frankley to Raddlebarn Lane in the one case, and to the north end of Frederick Road, Selly Oak, in the other. The amount of the contract is £142,169; and the time for execution two years.

THE CONTROL OF WATERSHED AREAS.

It may be remembered that a short time ago the County Councils Association invited suggestions from the County Councils of the country on the subject of the present condition of the law as affecting sources of water which are, or may become, necessary for local consumption, and the advisability of conferring powers upon local authorities in regard thereto. The Wilts County Council have made the following suggestions:—

1.—That the County Council, or some authority representing the whole of a county, be granted powers to protect the whole of the water supplies within the area of the county, whether derived from rivers, upland surfaces, springs, or wells.

2.—That the authority be made a Water Authority within the administrative area, with powers to promote Bills, construct works, and supply water in bulk to District Councils, and form Water Committees of combined District Councils upon receipt of petitions from Councils desiring to be so combined.

3.—That without the consent of such Authority no new well shall be sunk or works constructed for the impounding of water or the conveyance of water (for the purpose of sale) from one district to another or from one county to another, unless such well or works is or are authorized by an Act of Parliament; and that upon application for such an Act, the Authority shall have the right to be heard in opposition or otherwise.

4.—That after the passing of the Act, no well shall be sunk by which it is proposed to abstract large volumes of water (the Authority knowing the local circumstances to be the judge as to what constitutes a "large volume"), without the consent of the Authority. Such consent not to be necessary when a purely domestic supply is contemplated, either by a single owner or group of owners or land company, unless it is proposed to sell the water; the Authority in no case to grant consent without giving due notice, and allowing persons likely to be affected an opportunity of appearing and stating their objections. Upon granting consent, the Authority to be empowered to impose terms, granting compensation in water or money, or both, to persons proved to their satisfaction to be injuriously affected.

5.—Where it shall be brought to the knowledge of the Authority that, through mining, tunnelling, or other operations, there is, or is likely to be, any injury caused to any public or private sources of water supply, the Authority shall make an inquiry into the matter, and be empowered to insist upon the "best available means" being adopted to prevent such injury or waste, &c.

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COLCHESTER	300,000	WILKESBARRE, PA.	750,000
BIRKENHEAD	2,250,000	ST. CATHERINES (Second Contract)	250,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000
WINDSOR STREET WORKS, BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000
HALIFAX	1,000,000	YORK	750,000
TORONTO	250,000	ROCHESTER	500,000
OTTAWA	250,000	KINGSTON, ONT.,	300,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000
MONTREAL	500,000	DULUTH, MINN.	300,000
TORONTO (Second Contract; Remodelled)	2,000,000	CATERHAM	150,000
BELLEVILLE	250,000	LEICESTER	2,000,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000
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NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

As I begin to write these "Notes," my eye falls upon the report of a meeting of Volunteers, at which an officer in high station strongly urged that attention should be paid to night marching, as, in his opinion, "they might count upon it that that was the tactics of warfare nowadays." It seems to me that this method of conducting hostilities does not require to be urged upon Trade Union leaders. I have before me a letter from the Acting District Secretary of the Gas Workers' and General Labourers' Union of Great Britain and Ireland, published in the "Glasgow Herald" on Thursday, which, to my mind, is crawling in the trail of the night march. But before I reach the letter itself, I must announce that an effort is being made to drag into this very comprehensive body the employees of the National Telephone Company. This is surely one of the most notable moves in the dark which it is possible to conceive. What right the telephone employees could have in saying what should be the conditions of service within the Corporation gas-works, it is difficult to understand. Of course, no man lives to himself; and it is the right of every free citizen to take an interest in the conditions of employment of even the vendors of matches or newspapers. But this interest must manifest itself as the outcome of the national conscience, and not in the organization of hosts. The employment of telephone workers to back up the claims of gas workers, is as if the butler should persuade the roadman to assist him in prevailing upon the master to withdraw certain privileges from the family (the family here being the gas workers), who at present have perfect liberty, subject to discipline, to the chagrin of the domestics. To bring a body of washerwomen to the support of this precious Union would not be more out of place than is the invoking of the aid of the telephone workers. The move must stand condemned in the eyes of all except those who want to ingather threepences.

Turning to the letter itself, the first night march to be noted is that in which the writer postulates that arbitration and conciliation instead of strikes have been preached in season and out of season, from platform, pulpit, and Press; and that to refuse conciliation here, would be to slam the door in the face of Trade Unionists. A more vicious proposal was never enunciated. The refusal to co-operate in appointing a conciliation board here is not to slam the door in the face of any Trade Union. Even were it conceded that the Corporation should recognize a Union (which has not yet been done) they could not, and dare not, recognize this body, which is not a union of their workers, but a heterogeneous body of workers of all sorts—admittedly so by the very name of the body. Then we come to the astounding assumption that the Union are aspiring to conduct their operations in the light of day. This requires no comment; and scarcely less so does the statement following, that only those who have experienced it know how difficult it is to keep a class of labouring men like those employed at the gas-works well in hand, except one puts the interpretation—a quite feasible one—upon the remark that it is difficult to retain them in the membership unless something is being done "again" the employers. The climax of suggested movement in the dark is about reached in the statement that, if the Union officials were met respectfully, they could promise that nothing irregular would ever occur. How about this? Irregularity means something out of the usual course. Suppose Mr. Foulis were obliged to consult with a Trade Union functionary before he took on or discharged a man; or suppose he did either of these acts without the approbation, or against the opinion, subsequently expressed, of this functionary, and he declined to retrace the step he had taken—would the work go on regularly? Would not the greatest of all irregularities come to the front, in that having agreed, or been obliged to negotiate with this irresponsible individual, he must either submit to that individual's dictation or else have the works stopped? A deeper darkness, almost, enshrouds the next move, which is contained in the contention that the fact that a mistake had been made in the strike of a fortnight ago, was no argument why such mistakes should be possible to occur again through the maintenance of a system which lends itself to their happening. Such elusive reasoning can only delude those who wish to be deluded. At present, the men sign an agreement with their employers to serve for a certain time. They break this agreement, and leave their employment. The Union asks that the men shall cease to sign with their employers, and shall, instead, sign with them; and the implication is that men who have broken their written obligation to their employers, will be unfailingly obedient to these employers because they have undertaken vows to an outside body. I think I have given sufficient to show the will-o'-the-wisp nature of the propositions upon which the cause of the Union—which is a different matter from the cause of the men—is sought to be advocated.

The Gas Committee of the Glasgow Corporation have not yet given any deliverance on the subject of the strike; but three incidents have occurred which fall to be noted. The first was that on Saturday last a deputation of Town Councillors waited upon Mr. Foulis, to endeavour to get him to reinstate about 100 men who were still out at Dalmarnock; the second was the formal submission of a scheme for the formation of a Conciliation Board; and the third was the prosecution of eight of the strikers under the Conspiracy and Protection of Property Act of 1875, before Sheriff Boyd, yesterday. As to the first, friendly intervention on the part of the oppressed is a meritorious act; on the part of the deluded wrongdoer, it is less so, and it is seldom requited; while on behalf of the deliberate wrongdoer, it is effort thrown away, for it almost invariably fails to reform, and it is about the most thankless task to which the benevolently minded can set themselves. The Glasgow gas stokers are certainly not in the first category; and I would not like to place them in the third. They were rather deluded into wrongdoing, in the belief that now that they had a Union they could compel all the good things they wanted to come to them. Intervention on behalf of men in such a position should, naturally, have taken the form of an expression of contrition, and an undertaking by them to keep clear of Union ways in future. This was not the sort of intervention here. It was the members of Council who are most strenuous supporters of Treaty Unionism who made up the deputation. Put in plain language, their mission was to tell Mr. Foulis that, seeing they had failed to

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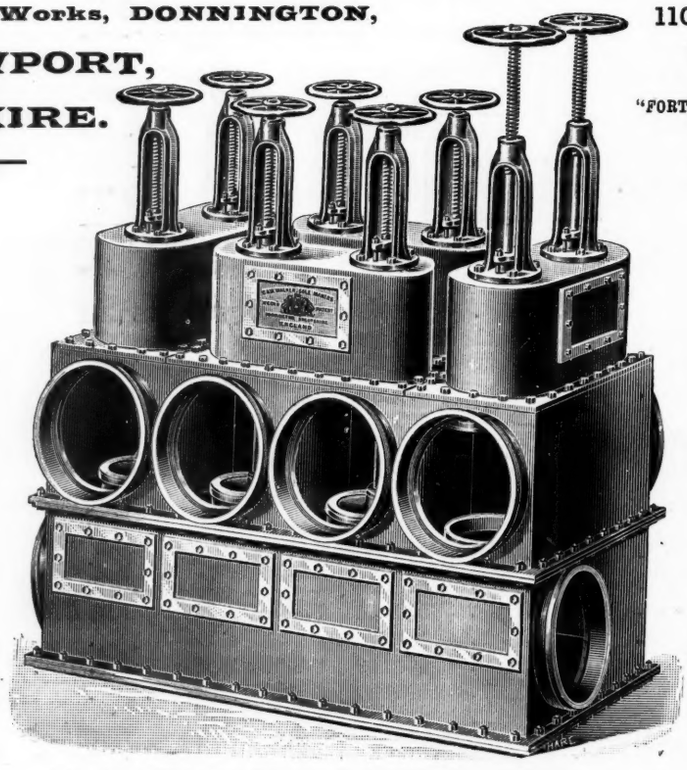

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throw the city into darkness, he had better forgive and forget everything, and take the men back to their old posts, and that, the men being reinstated, the Corporation would have no trouble from them—until the men thought themselves strong enough to succeed. Mr. Foulis was probably alive to the nature of the "good offices" of the deputation; for all he would undertake was that he would give the statements which had been made his best consideration, and that he would re-start a number of the men as soon as places could be found for them. This is a reply which is unmistakably founded upon the principle of the non-recognition of the Union; and in that light it will be welcomed in many quarters.

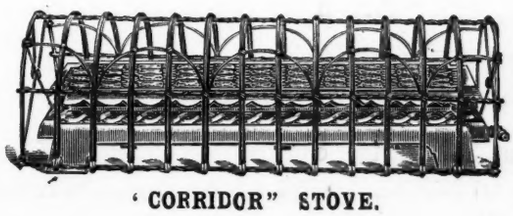
The proposal for the formation of a Conciliation Board is before the Committee. When they come to a decision on the subject, probably a month or two hence, the community may have all but forgotten recent events, which will make for the preservation of peace. Diplomatic events which are conducted in leisure are usually the most successful in the long run.

The prosecution of the men was the biggest of the three events. Last week it was given out that the Gas Committee were to use their influence to prevent prosecution of the men who struck work. This expression was happily employed, because in Scotland that is all that they had in their power to do. It is different in other parts of the realm, where the Corporation would themselves be the prosecutors. In Scotland, the Public Prosecutor, known as the Procurator-Fiscal, undertakes prosecutions in the public interest. He does not, in practice, institute prosecutions without his attention being called to the offence; but the police are everywhere, and they are constantly reporting to the Fiscal, for his consideration, all that occurs to them to be transgressions of the law. Besides the police, it is open to anyone to complain to the Fiscal. After consideration, the Fiscal may or may not prosecute; or he may, in most cases, give his consent to a private individual or corporation to prosecute. One of the exceptions to the latter clause is under this Act, which lays down imperatively that every offence shall be prosecuted by the Lord Advocate (who is the head of the fiscal department) or by the Fiscal. I have shown how many channels there are through which the attention of the Fiscal may be called to an offence; and with a statutory command such as is here, it was not possible to avoid prosecution. The men were brought before Sheriff Boyd—a Judge who has earned for himself the name of "the poor man's advocate," on account of the solicitude he manifests lest he should do anything which would be oppressive to the lower classes. The accused men pleaded guilty. Had they done otherwise, the truth would have had to come out, in a way which it does not necessarily do in the statement of a defending lawyer. For instance, we would have known what was really at the bottom of the strike, and who were the instigators of it. The defending lawyer said it was on account of non-ratepayers having been engaged, and that it did not arise out of the employment of non-Union men, because, as matter of fact, non-Union men were employed without any objection from the Union. On the other hand, the Secretary of the Union, in his letter to the "Glasgow Herald," says it was a strike against the promotion of a non-Union man, because he had resolutely refused to join the Union. I do not profess to be able to hold the scales to a nicety in this matter; but I can say that, had evidence been led, the Sheriff would have been enlightened to this extent, that the resolution to prefer ratepayers for municipal employment was not as stated, but only "so far as practicable." There is a considerable difference between the two positions; but that was not before the Sheriff. A pecuniary penalty was asked on behalf of the men; and Sheriff Boyd, with his customary mercifulness, conceded so much. The statute provides that a person convicted under it may be either imprisoned or subjected to a money penalty. But in the case of a money penalty, it is provided that the conviction must set out the period within which payment must be made; and that in default of payment within the time specified, there must be imprisonment for a period also specified, or until payment. The procedure is intricate. There are many opportunities for defects creeping in; and the probability is not remote that the convictions may be set aside upon a technicality.

The Edinburgh and Leith Gas Commission held their first meeting after the elections on Monday; and, of necessity, the newly returned members took the statutory obligation of fidelity to the undertaking. Mr. Kinloch Anderson—our old friend who has hitherto been known as a Bailie of the City of Edinburgh, but who has returned to the ranks of common councillor, believing that honours should go round—said that the increased output of gas for the period of the year which has elapsed was equal to 6·52 per cent., as compared with an increase in the corresponding period of last year of 3·92 per cent. He added, probably in reply to remarks made at the previous month's meeting, that the quality was up to the mark. This quality, as reported by Mr. Herring, was over 25 candles; and, as a matter of fact, it was not so good as in the corresponding month of last year.

Mr. Kinloch Anderson was re-elected Convener of the Works Committee, a position which he has held since the Commission was formed in 1888, and which it is not exaggerating to say that he has adorned, and, further, that there is nobody who could take his place. Bailie Manclark, of Leith, who has also filled the important, though less responsible, position of Convener of the Finance and Law Committee for some years, was also re-elected.

Sir Andrew M'Donald, ex-Lord Provost of Edinburgh, who during his term of office took a very deep interest in the affairs of the Gas Commission, and continues to do so since his return to municipal life, said that they had had a long meeting of the Cleaning and Lighting Committee of the Edinburgh Town Council that day; and among the matters considered was that of the use of incandescent lamps in the street lighting. They had been waiting to know what the actual cost of the upkeep of these lights would be, with the view of considering it in relation to the ordinary gas-lamps and the electric light. Mr. Herring, the Engineer, had sent in an amended charge in connection with these lights; and although he did not propose that they should discuss it further just now, he thought a small Committee should be appointed to confer with the Cleaning and Lighting Committee of Edinburgh on the subject, and allow them to settle once for all what was to be the actual price for these improved lights for Edinburgh and Leith. It was agreed to remit the matter to the Works Committee.



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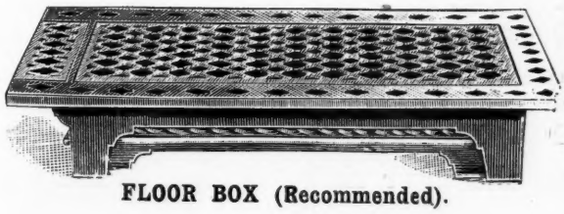

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CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Dec.* 2.

Sulphate of Ammonia.—In the early part of the week, there was a further advance in values; and, although the tone of the market has since been quieter, all parcels offered have been taken up at the advance. The closing prices are £11 5s. to £11 8s. 9d. per ton, delivered f.o.b. at the ports. There is still large inquiry; but urgent orders being filled for the most part, consumers are now trying to get in at some decline for their December requirements. Attention is still directed to the forward position; and further important business has been done at up to £11 10s. per ton, London (Beckton) terms, January-March delivery, and £11 12s. 6d. ordinary terms, January-June delivery, f.o.b. Leith.

Nitrate of Soda is about 1½d. per quintal, down on the west coast; and near cargoes are also easier. But on spot 7s. 10½d. per cwt. for good, and 8s. for refined, are still the quotations.

LONDON, *Dec.* 2.

Tar Products.—The difficulty in securing freights either for whole cargoes or parcels is doubtless much interfering with business. There has never been a time before with such difficulty in securing shipments for products. The advance in freights is also a matter of serious moment to buyers, as well as sellers. Pitch continues nominally 34s. and 32s. as below; but business has been done at less money. A steady market exists for creosote and grease oils; the larger output so far not having seriously affected their value. Carbolic acid is very scarce, and is again quoted higher. Anthracene continues nominally quoted; but there are very few makers who will accept the prices mentioned below—indeed it is worth as much left in the oils or pitch. Benzol is again inquired for; but buyers are offering less money. The output of 90's has undoubtedly largely increased; and it is somewhat astonishing how it is absorbed, as few makers hold any stock.

The average quotations of the week are: Tar, 16s. 6d. to 25s. 6d. Pitch, east coast, 34s.; west coast, 32s. Benzol, 90's, 8d.; 50's, 10½d. Toluol, 90 per cent., 1s. 3½d.; pure, 2s. 4d. Solvent naphtha, 1s. 3d. Crude, 30 per cent., naphtha, 5d. Heavy naphtha, 1s. 3d. Creosote, 3d. Heavy oils, 65s. Carbolic acid, 50's, 2s. 8d.; 60's, 2s. 10½d. Crude naphthalene, 55s. Anthracene, nominal, "A," 3½d.; "B," 2½d.

Sulphate of Ammonia.—A happy change has come over this market; and buyers are now anxious to cover their immediate and prospective requirements. Higher prices are being paid; and production is entirely absorbed. There is a remarkable absence of stocks either in makers' or buyers' hands. To-day's value is about £11 5s. to £11 10s. per ton, less 3½ per cent. at the chief ports.

Fatality at the Redheugh Gas-Works.—On Saturday, the 25th ult., one of the stokers at the Redheugh works of the Newcastle and Gateshead Gas Company fell down the coke-hole in front of a bench of retorts, and alighted upon a heap of white-hot coke. He was very severely burned, and died the next night.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—The anticipations of a general upward movement in prices on all descriptions of fuel, referred to last week, have been fully realized; circulars having been sent out by the leading Manchester collieries announcing advances of 10d. per ton on round coal and engine fuel, while the members of the Lancashire Coal Sales Association, representing West Lancashire, have announced advances of 10d. per ton on round coal, 1s. 3d. on unscreened coal, and 1s. 8d. on engine fuel. An endeavour was made to secure the co-operation of the Manchester collieries in an increase of 1s. 8d. on engine fuel; and though this was not successful, the West Lancashire collieries were not in any way deterred from carrying out their original intention. It was, however, thought that, in districts where the West Lancashire pits come into competition with the Manchester collieries, this may cause some irregularity in quotations; but with the general scarcity of slack, there is not much probability of any material easing down on the full quotations, as collieries have practically so little to offer in the open market that they are indifferent about selling at all, except at their maximum prices. House-fire qualities are still only in moderate request; and even the advance does not seem to have briskened up the inquiry to any material extent. Common round coals are in much the same active demand as previously reported for steam and forge purposes, with supplies barely equal to present requirements. At the pit mouth, prices now average 13s. 4d. to 13s. 10d. per ton for best Wigan Arley, 11s. 8d. to 12s. 6d. for Pemberton four-feet and seconds Arley, 10s. 6d. to 11s. for common round coal, 7s. to 7s. 6d. for common slack, 8s. to 8s. 6d. for good medium qualities, and 8s. 6d. up to 9s. 6d. for the very best sorts. Shipping is active, with prices hardening; 12s. per ton being now about the average for steam coal delivered at the ports on the Mersey or the Manchester Ship Canal. Lancashire manufacturers have made no further official advance in list quotations, but are exceedingly firm at maximum rates, with their production inadequate to meet present requirements. Good foundry coke averages 28s. per ton, and furnace qualities 21s. to 22s. at the ovens.

Northern Coal Trade.—There is very great scarcity in the coal trade of the North-east; and prices are firmer generally, with advances in some cases. Best Northumbrian steam coals are decidedly brisker in demand; and the price now quoted is 14s. per ton f.o.b. Second-class steams are 13s. per ton, and steam smalls 8s. In gas coals the scarcity is great; and to obtain additional supplies very high prices have to be paid. As much as 15s. per ton f.o.b. has been offered and refused for best Durham gas coals, for delivery this month; and the price named may be looked on as the usual quotation for early delivery of occasional cargoes. For manufacturing coals, the demand is good; and very high prices are being paid for coal for next year's contracts. Gas coke is now in fuller supply; but stocks are not heavy. Prices are from 14s. to 14s. 6d. per ton f.o.b. for export.

Scotch Coal Trade.—There is great activity in the coal trade in Scotland. Prices are advancing; and inquiries for forward delivery

PUBLIC CAUTION.

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lately placed upon the Market. All DEALERS and USERS of the

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are requested to ignore the Newspaper threats of the Sunlight Company, and, in case of an action being brought, to at once communicate with the Welsbach Company, who, upon receipt of the writ, are prepared to take the defence of the action into their own hands, and to indemnify the person attacked from all consequences.

MANTLES.

DEALERS and USERS are also WARNED not to believe the rumours circulated by Infringers, that the Company's Patent Rights expire shortly. These rights

EXIST UNTIL 1907;

and the Company will continue to uphold their rights, and to Suppress all Infringements of Mantles as well as of Burners.

THE WELSBACH INCANDESCENT GAS-LIGHT COMPANY, LIMITED,
76-80, York Street,
Westminster, London, S.W.

continue. The reason is to be found in the great demand for Welsh coal, which reacts upon Scotland through the North of England. A larger trade could be done, were it not for the scarcity of ships. The prices quoted are: Main 10s. 3d. to 10s. 6d. per ton f.o.b. Glasgow, ell 11s. to 12s., and splint 11s. 6d. to 12s. The shipments for the week were 182,889 tons—a decrease of 5767 tons upon the previous week, but an increase of 11,703 tons upon the corresponding week of last year. For the year to date, the total shipments have been 8,014,888 tons—a decrease of 877,750 tons upon the same period of last year.

More Labour Troubles at the Llanelly Gas-Works.—We learn from the "South Wales Daily News" that there is a possibility of another strike at the Llanelly Gas-Works; a demand having been made by the stokers for an increase of 9d. per day—their present pay being 4s. 3d. In a letter to Mr. W. Thorne, the General Secretary of the Gas Workers' Union, the Manager of the works (Mr. A. R. Cawley) pointed out that the stokers at Llanelly are remunerated as well as, if not better than, those in any place in South Wales, or even in England; and he said his Directors could not understand why they were asked to pay better wages than was done in other places.

Settlement of the South Metropolitan Gas Company's Building-Line Dispute.—It may be remembered that just a year ago the Magistrate at the Greenwich Police Court (Mr. G. G. Kennedy) gave judgment against the South Metropolitan Gas Company in an action brought against them by the London County Council for an infraction of the London Building Act, 1894, by the erection of a coal-shed at the Rotherhithe Gas-Works within the prescribed distance of 20 feet from the centre of the roadway, without having first obtained the Council's consent. The Company decided to appeal; but we learn that the matter has been settled by the parties coming to an arrangement which will allow of the widening of the street in respect of which the proceedings were taken.

Trouble with the Stokers at the Fenton Gas-Works.—Following the ordinary business of the Fenton District Council last Tuesday, the members resolved themselves into a Gas Committee, when notices handed in by the workmen employed in the carbonizing department of the gas-works were accepted, and a Committee appointed to take such steps in the matter as were thought advisable. The notices were, it was understood, handed in as a protest against the dismissal of two men by the Gas Committee; their fellows thinking the action one of an arbitrary character. It was hoped the Council would be able to retain in their service those workmen who had served them faithfully in the past; and that, with the sympathy and assistance of the townspeople, the vacancies would be filled up, and the works carried on as successfully as ever.

Newhaven and Seaford Water Company.—The accounts presented at the annual meeting of this Company a few days since showed a profit of £1732; and a balance of £1663 available for dividend. The Directors recommended that a dividend at the rate of 4 per cent. per annum, free of income-tax, be declared, amounting to £1120; and leaving a balance of £547. Of this £248 is to be carried to the suspense account, and the balance, £299, forward. The rental during the year was increased by £218. Several new additions to the works have been completed, or are approaching that state. The cost of the successful opposition to the Purchase Bill of the District Councils last session amounted to £776; and this the Directors have carried to a suspense account. Official changes have been made, which are referred to to-day in a "Personal" paragraph.

The Forthcoming Gas and Allied Trades Exhibition.—The following firms, among others, will be exhibiting at the above-named exhibition, which will be held at the Royal Aquarium, Westminster, from the 21st inst. to the 23rd prox.: Gas Plant and Meter Makers, &c.—Messrs. Thomas Glover and Co., Limited; West's Gas Improvement Company, Limited; Messrs. S. Cutler and Sons. Gas Lighting and Illuminating—Welsbach Incandescent Gas-Light Company, Limited; New Sunlight Incandescent Company, Limited; Voelker Mantle Company, Limited; Hydro-Incandescent Gas-Light Company, Limited; Denayrouze Light Syndicate; Van Vriesland's Oil Gas; C. Maynard Walker; Spiral Globe Company, Limited. Gas-Stove Makers—Messrs. S. Clark and Co., "Syphon" Stoves; Messrs. Wright and Butler, Limited; The Davis Gas-Stove Company, Limited; Messrs. R. & A. Main, Limited. Gas Fittings, Burners, &c.—Messrs. Falk, Stadelmann, and Co., Limited; Incandescent Accessories Maintenance Syndicate, Limited; Mr. J. W. Wilson. Gas-Engine Makers—Messrs. Crossley Bros.; Messrs. Bibbie, Hobson, and Co.; Messrs. Thorpe and Salter. Acetylene Gas—Messrs. Thorn and Hoddle; Buffington Acetylene Gas-Light Company, Limited; Acetylene Illuminating Company, Limited; Husson Safety Acetylene Syndicate; Turr's Acetylene Syndicate; Acetylithe Lighting Syndicate; F. Dye Heating Company.

Sales of Shares.—At the Mart last Wednesday, Mr. Alfred Richards sold £5000 of "D" gas stock of the Barnet District Gas and Water Company (last dividend £6 6s. per cent. per annum), at prices ranging from £132 10s. to £141 per £100 of stock; some £10 shares, on which 5½ per cent. is being paid, in the Southend Water Company, at £14 10s. to £14 17s. 6d. each; some "C" shares in the Harrow and Stanmore Gas Company (similar shares receiving £5 12s. per cent. per annum), at £12 and £12 2s. 6d. each; and a small quantity of 4 per cent. perpetual debenture stock of the Reading Gas Company, at £121 per £100 of stock. At a sale in Leeds on Tuesday, shares in the Mirfield Gas Company realized £12 8s. 9d. each. On Wednesday, Mr. Walker Walmsley sold at Yeadon £2000 ordinary new "B" stock in the Yeadon and Guiseley Gas Company, at prices ranging from £18 1s. to £18 7s. 6d. per £10 worth; the total amount realized being £3632. On Thursday, Messrs. George Nichols, Smith, and Alder sold by auction at Bristol £10,000 of the general capital stock of the Bristol Gas Company, bearing a maximum dividend of 5 per cent. Ten lots sold at £124 15s., two at £125 5s., and the rest at £125; the average being £124 19s. 7 1-5d. The total produced by the sale was £12,498. At Chatham, Messrs. Kidwell and Sons disposed last week of four £5 "A" shares in the local Water Company, at £15 per share. Sixteen similar shares realized £14 17s. 6d. each.

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Gas Explosion at Esher.—A serious explosion of gas occurred recently at the junction of two roads near Esher Station. A strong smell of gas had been noticeable for some time, and some of the Kingston-on-Thames Gas Company's employees who were working near decided to discover where it came from. One of them went with a light over some very large manholes and vaults containing the automatic pumps connected with the sewage works, when a violent explosion took place. It appears that the main was cracked, and the gas had escaped into the manholes and vaults. The heavy roofs of these were lifted high out of the ground; and large pieces of concrete and quantities of earth were blown across the road. Two of the men were slightly injured.

Opening Roads Without Notice.—At the last monthly meeting of the Skipton Rural District Council, the Surveyor (Mr. A. Rodwell) reported on the breaking up of a street at Earby by the Earby Gas Company without prior notice; and instructions were given to the Clerk to require a restoration of the road within 48 hours, failing which the Council would do the repairs, and charge the Gas Company with the cost, and also require the payment of £2 as a fine. The Clerk now said the Gas Company had written to the effect that it was imperative that the work for which the road was broken up should be attended to at once. They said they would take great care in the future that the Council should not have any complaint to make, and they asked for a withdrawal of the fine under the circumstances. The Surveyor said that when he found the road was being opened, the officers of the Company said nothing about a case of emergency. They stated that they were relaying pipes. It was decided to enforce the fine.

The Lighting of Singapore.—We learn from a Singapore paper for Oct. 27, lately to hand, that there was then a prospect of the city having to be lighted early next year by oil. The Gas Company's existing contract was to expire at the close of December; and no definite arrangements had been made for its extension. The Municipality had declined to purchase the Company's undertaking; there was no time to put up gas-works of their own, as they seemed inclined to do; and the schemes of electric lighting submitted to them could not be entertained, owing to financial considerations. Under the circumstances, the only thing to be done was to look to oil as the lighting agent; and a local firm had expressed their willingness to undertake the supply of the lamps and labour, but they would not "stand the racket of variations in the price of oil," as the President of the Municipal Commission, who seemed inclined to make a trial of oil, put it. The "Singapore Free Press"—the paper above alluded to—in commenting upon this matter, remarked: "We do not think the general public will share the President's confidence. The trimming, lighting, and extinguishing of a large number of lamps, and the supply of lamps, wick, and oil, need much organization. It is, of course, quite easy to do it with plenty of time and ample resources. We do not know whether either of these exist; but the risk of a failure in the lighting of the town, and a consequent increase in crime, is not one to be viewed with complacency." We should think not; and it seems to us that the easiest way out of the difficulty would be for the Municipality to make at all events a provisional contract with the Gas Company to continue the lighting.

Otley Water Bill.—The ratepayers of Otley, in public meeting assembled, have empowered the Council to promote a Bill in Parliament (noticed last week), enabling them to impound the waters of March Ghyll—a tributary on the north side of the Wharfe, at Middleton—and to construct a reservoir, at an estimated cost of £43,000.

Incandescent Gas Lighting at West Ardsley.—The main roads of West Ardsley have lately been lighted by incandescent lamps; and the inauguration of the new system was celebrated by a supper. The scheme is the outcome of the continued efforts of Mr. J. Holliday, the Chairman of the Lighting Committee, who was presented with a pair of gold-plated candlesticks in recognition of his services in that capacity.

The Quality of the Gas at Guildford.—Dr. Rideal recently paid a surprise visit to the Guildford Gas-Works, and tested the gas, in which he found large quantities of sulphuretted hydrogen. He communicated this fact in a letter to the Town Clerk (Mr. F. F. Smallpeice), who read it at the meeting of the Town Council last Tuesday; and it was referred to the Lighting Committee, with instructions to confer with the Town Clerk as to the Council's position.

Gas Stokers' Work at Lancaster.—The Gas Committee of the Lancaster Corporation have had under consideration an application of the gas stokers for an increase in their wages, or, in the alternative, for a reduction in their work. The Gas Engineer (Mr. C. Armitage) submitted to the Committee information as to the duties and wages of gas stokers in twenty other towns similar to Lancaster; and it was resolved that the stokers be relieved of the duty of wheeling the coke from the bottom of the run leading to the platform and tip when the coke is stored in the lower yard—they continuing to wheel the coke into the front yard, between the railway lines, as heretofore. The Council have agreed to this.

Newtown (Mon.) Gas-Works Purchase Question.—The ratepayers of Newtown (Mon.) have, at a public meeting, endorsed the action of the District Council in promoting a Bill in Parliament. The resolution was moved by the Chairman of the Council (Mr. A. S. Cooke); and among the speakers supporting it was Colonel E. Pryce-Jones, M.P. He said he did not know of a single instance where the introduction of the electric light had affected a gas company or a gas consumer. It had been argued that it would be wiser to risk having to pay later £5000 or £6000 more for the gas-works than to purchase them at present. But it was not a question of £5000. The income of the Company was about £1100; and if the town had to pay them 22 years' purchase on their income, this would mean something like £23,000. Twenty years hence, he ventured to predict, the income would be nearer £2000. The town could not then buy for 22 years' purchase, but probably for 30 years, which would mean £60,000, *plus* 10 per cent. for compulsory purchase, and the expense of forcing the Company to sell. There was at present a monopoly in the production of a commodity as necessary to them almost as the air they breathed. The price they were going to pay for it would, he felt sure, be a fair one. He was confident the gas shareholders, and even the Directors, would take a lesson from what had happened in connection with the transfer of the water-works, and would meet the town in a friendly spirit. Only four of the ratepayers present voted against the resolution.

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The Proposed Joint Water Board for Bury.—Special meetings of most of the Local Authorities in the water-supply area of the Bury Corporation have lately been held, for the purpose of considering and passing a resolution or resolutions authorizing the Mayor, aldermen, and burgesses of the borough of Bury to apply to Parliament next session for sanction to the formation of a Joint Water Board, pursuant to an agreement dated the 11th of April, 1899, and made between the Bury Corporation and the Corporation of Haslingden, the Radcliffe, Ramsbottom, Little Lever, and Whitefield Urban Councils, and the Bury Rural Council, to define the constitution thereof, and to make all other necessary provisions in connection therewith. The resolution was passed.

The Blackburn Asphyxiation Case.—On Monday last week, a Coroner's Jury returned a verdict of "Accidental death" in the case of James Eatough, aged 70, who was asphyxiated by gas in a lodging-house at Furthergate, Blackburn, on the previous Saturday morning, when, as reported in the "JOURNAL" last week, two other men, named Daly and Bennett, had narrow escapes. Eatough, who was the last to go to bed, turned out the gas, but left the tap on. The tenant, William Ramsbottom, deposed that he went into the men's room at 6.30 a.m. to awaken Daly, and found it full of gas; there being a sack of straw in the chimney and a board in front of the fireplace to prevent draught. As he could not rouse Daly and Eatough, he summoned assistance. When Dr. Keighley arrived, Eatough was dead, Daly unconscious, and Bennett recovering. In the course of the proceedings, it was stated that the room was not too small for three men, but the ventilation was inadequate, owing to the chimney being blocked up. It was a great mistake to stop the chimney draught. Dr. Keighley spoke highly of the conduct of the police, whose promptness in resorting to artificial respiration had saved Daly.

Completion of New Water-Works for the Supply of Hoylake.—The ceremony of starting the new engine for the pumping of water to supply the districts of Hoylake and West Kirby took place last Saturday. Since 1878, when the original works were commenced by the Hoylake and West Kirby Gas and Water Company, Limited, the continued growth of the district has necessitated the sinking of new wells and the provision of more powerful machinery for pumping purposes. In 1878 the machinery then employed was capable of lifting 20,000 gallons of water per hour; whereas the new machinery, with the aid of the existing machinery, is equal to pumping 100,000 gallons per hour, or nearly 2,500,000 gallons per day. This is likely to be adequate for the requirements of the district for some time to come. The maximum quantity supplied at present is about 500,000 gallons per day. The Directors are now applying for powers to enable them to construct another reservoir capable of holding 2 million gallons of water, a water-tower 66 feet in height, and also to sink another borehole from the bottom of No. 2 well to any required depth.

Manchester and the Water Supply of Atherton.—An application by the Atherton District Council to borrow £1500 for works of water supply, was the subject of an inquiry by Mr. H. H. Law, of the Local Government Board, last Wednesday; and from the statement made to him by the Clerk of the Council (Mr. D. Schofield), it appears that they entertain the opinion that they are being dealt with harshly by the Manchester Corporation. Mr. Schofield said the quantities of water to which the district was entitled under agreements with Manchester (through Tyldesley) and Bolton were 200,000 gallons and 100,000 gallons daily respectively. While, however, they were taking from Bolton 9 per cent. more than the quantity agreed upon, the Manchester supply fell 42 per cent. short of the stipulated quantity. The cause of this anomaly, which was also the ground of the present application, was the defective pressure of the Manchester supply. The quantity contracted for would have been sufficient for the needs of the district had it been obtainable, and the supply from Bolton, which was dearer than that from Manchester, would have been unnecessary, as any additional quantity required in future ought to have been supplied from the Thirlmere system. The Manchester Corporation repudiated all liability to provide adequate pressure, and had even declined suggestions that they should be reimbursed the expense of larger mains by an increased charge for the water on their undertaking to maintain the pressure. They also declined to allow a connection with the Thirlmere main, except upon the terms upon which any authority on the route could claim it under the Act. If the Council accepted these terms, the cost would be increased by £1369 a year. The policy of the Manchester Corporation appeared to be to force the Council to pay this large increase in price. The Council would probably in the near future have to submit to the Local Government Board some scheme for the improvement of the supply. Failing other arrangements with Manchester, it would be necessary to provide machinery for creating pressure, in order to obtain the full advantage of the present agreement. The district was wholly unprotected against fire; and the sum now applied for was to enable the Council to construct a new main to secure from Bolton a supply at a sufficient pressure.

New Water-Works for Exeter.—The Exeter City Council have received the sanction of the Local Government Board to a loan of £36,000 for works of water supply; the amount to be repaid within 32 years.

Saltash Water Supply.—The Corporation of Saltash have decided to lay an auxiliary pipe across the River Tamar, so as to ensure a supply of water in the event of the present pipe being broken or blocked. They also propose to construct a reservoir which will be an additional safeguard against a stoppage of the supply.

Grand Junction Water-Works Company.—In the report to be presented to the shareholders of this Company at the half-yearly meeting on the 13th inst., the Directors state that their surplus resources for filtration and pumping have been of the greatest service, and were utilized to assist the East London Company during the severe drought of the past summer. The reservoir works at Staines are progressing most satisfactorily, and will probably be ready for use in 1902. The report of the Royal Commission is expected to be ready shortly. The accounts accompanying the report show that the water-rents in the six months ending Sept. 30 last amounted to £112,338, as compared with £108,718 in the corresponding period of 1898; and a sum of £5291 is put down for water supplied to the East London Company. The total revenue is £118,816. The expenditure comes to £54,525; £59,291 is placed to the dividend and interest account; and £5000 is carried forward. The amount available for distribution is £64,027, as compared with £52,418; and the Directors recommend a dividend at the rate of 7½ per cent. per annum on the £50 "A" and the £25 "B" and "C" shares, and of 7 per cent. per annum on the £50 "D" shares.

Paignton Water Supply.—A detailed report on the new water scheme was presented to the Paignton District Council on Thursday last. The proposal is to purchase 700 acres of land on Dartmoor, and, by building a dam 50 feet high and between 400 and 500 feet long, to make a reservoir capable of holding 180 million gallons. A service reservoir and filter-beds for the supply of the high-level district are to be constructed, and the ordinary levels will be supplied through the present service reservoir. The cost of the land is estimated at £8000, and of the remainder of the scheme at £38,198; making a total of £46,198. Mr. F. W. Puddicombe, Chairman of the Water Committee, presented a report which showed that the probable annual charge would be £2150. This, added to the annual cost of the present works, made a total of £3703. The Committee anticipated that it would be necessary to raise the water-rate from 1s. to 1s. 6d., but that, with the development of the town and the consequent increase of the revenue, the rate will drop 1d. in the pound about every alternate year, until in 1915 the rate will be reduced to 1s. Among the advantages of the scheme would be a continuous supply of filtered water of the finest quality, and an unlimited supply for gardens and every other purpose, including the extinguishing of fires. They would also be able to afford supplies to other towns; and if they were fortunate enough to get the price which Torquay wanted Paignton to pay, they would receive considerable additional revenue. The Chairman of the Council (Mr. W. Lambshead) moved the adoption of the report, and said that if, instead of adopting this scheme, they became customers of the Torquay Corporation, they would have to meet a heavy annual charge, and at the end of thirty years would have nothing to show for it. If they were dependent upon Torquay, they might find, too, that it would want to annex them. A letter was received from the Town Clerk of Torquay offering discounts on a sliding scale from the charge of 1s. per 1000 gallons per annum which had been previously quoted as the price of a supply from Torquay. Mr. Westlake said this offer might as well have been made at first; but, in any case, it was not one which they could entertain. The report was adopted; and it was decided to inform the Torquay Corporation that their offer could not be accepted.

The number of prepayment gas-meters in use in Stourbridge, according to the Gas Committee's last report, is 2437, and of cookers 1105.

Messrs. W. C. Holmes and Co., of Huddersfield, have received an order from the Ilford Gas Company for one of their patent "New" scrubber-washers, of a capacity of 2 million cubic feet per diem.

At the Mart to-morrow, Mr. Alfred Richards will offer for sale stocks and shares in the Commercial, Lea Bridge, Harwich, and Maidenhead Gas Companies, and in the South Essex Water Company.

At the annual meeting of the "Era" Incandescent Oil-Lamp Company, Limited, held last Tuesday, the Chairman (Mr. A. C. Lyster) expressed the regret of the Directors that they were unable to pay any dividend. He said the exploitation of the lamp had been much more difficult and more protracted than was expected both at the formation of the Company and when the Directors met the shareholders at the first ordinary general meeting, on May 19, 1898.

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BALE'S OXIDE OF IRON, of finest Quality. Summer delivery specially recommended for efficiency and economy.
FIRE CEMENT, PAINT, and CHEMICALS.
120 and 121, NEWGATE STREET, LONDON, E.C.

SADLER & CO., Ltd., Middlesbrough,
Tar Distillers and Tar Colour Manufacturers.
BENZOL specially prepared for Gas Enrichment free from Sulphur. Pure Hydrated OXIDE OF IRON for Purifying Gas either for Sale or Lent on Hire. Always Buyers of GAS TAR and AMMONIACAL LIQUOR.

CANNEL, COAL, ETC.
JOHN ROMANS & SON, EDINBURGH,
Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / NEWTON GRANGE, NEWBATTLE, DALKEITH, } SCOTLAND.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS. Correspondence invited.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "PORTER, LINCOLN."
[For Illustrated Advertisement, see p. 1400]

SULPHURIC ACID for Sale.
BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SHEFFIELD CHEMICAL COMPANY, LIMITED.
BUYERS of Spent Oxide. Sellers of OXIDE OF IRON and SULPHURIC ACID.

GAS CARBON Wanted, not less than 4-Ton Loads.
Apply to the BRIMINGTON CARBON COMPANY, Sowerby Bridge, YORKS.

SPECIAL PAINT FOR GAS-WORKS.
JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1769.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

AMMONIACAL LIQUOR wanted.
BROTHERTON AND CO., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PATENTS FOR INVENTIONS.
Messrs. J. C. CHAPMAN & CO., Chartered Patent Agents, ADVISE ON ALL MATTERS CONNECTED WITH ABOVE.
Information and Handbook on application.
70, CHANCERY LANE, LONDON, W.C.

SPENT OXIDE wanted.
BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

BENZOL, specially made for the Enrichment of Gas.
ELLISON AND MITCHELL, LIMITED, Kilnhurst, near ROTHERHAM.

GAS TAR wanted.
BROTHERTON AND CO, Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

ENRICH your Gas with cheap Benzol.
Specially prepared, free from sulphur. At to-day's Price of Benzol, ILLUMINATING POWER costs less than ONE-THIRD OF A PENNY PER CANDLE.
Apply to SADLER AND CO., MIDDLESBROUGH.

PRACTICAL RETORT SETTERS.
BATES & NUTTALL, 32, Havelock Road, Saltley, Birmingham.
Regenerator or other Furnaces erected to Engineers' own Designs. Best Work Guaranteed. Please write for Estimates.

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special attention to Repairs.
Before placing Orders, please write for Estimate.
Telegraphic Address: "SATURATORS, BOLTON."

PORTSEA ISLAND GASLIGHT COMPANY.
WANTED, a Foreman Retort Setter.
Candidates must have had the control of Workmen, also be able to set out Work from Drawings, and capable of adjusting Heats in Retort-Settings on both Direct and Regenerative Systems of Firing. Wages £2 7s. per week.
Apply, by letter, stating Age, Qualifications, and accompanied by *copies* of Testimonials to
J. D. ASHWORTH,
Engineer.
Engineer's Offices, Gas-Works,
Portsmouth, Nov. 27, 1899.

AN Engineer of a Provincial Gas-Company, with a Consulting Practice, has a vacancy for a PUPIL. Highest References given and required. Moderate Premium.
Apply, in first instance, to No. 3393, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

DRAUGHTSMAN and Gas-Works ASSISTANT desires ENGAGEMENT. Good Testimonials. Twenty Years' Experience.
Address "GAS," 2, Thornton Grove, Upper Armley, LEEDS.

TRAVELLER calling on Gas Companies wishes to REPRESENT GOOD FIRM, or will accept Commissions.
Address No. 3396, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an efficient Clerk, used to Gas Company's Office routine and Accounts.
Apply, in own Handwriting, stating Age, Experience, Wages required, and enclosing *copies only* of two recent Testimonials, to J. H. TROUGHTON, Gas-Works, NEWMARKET.

WANTED, a Chief Draughtsman.
Must be conversant with Retort-Settings and general Gas-Works Plant.
State Age, Experience, and Salary required, to the LEEDS FIRE-CLAY COMPANY, LIMITED, Engineering Department, Wortley, near LEEDS.

WANTED, by a Suburban Gas Company, a GAS-FITTER, well up in Fixing Gas-Stoves, Prepayment Meter House Fittings, &c. Permanent Work.
Applications, stating Age and Experience, to be addressed to No. 3392, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

LEADING Draughtsman wanted by a Firm of Gas Engineers. Must be well up in Estimating, and the Design and Details of Gas Plant throughout.
Apply, by letter, stating Age, Experience, References, and Salary required, to No. 3387, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS ENGINEER AND MANAGER.
WANTED, for a Colonial Gas-Works of importance, a thoroughly qualified ENGINEER and MANAGER. Salary about £400 per annum.
Letters, without Testimonials, but with full Particulars of past and present Employment, to be addressed to COLONIAL, care of Messrs. Street and Co., Advertising Agents, 30, CORNHILL, E.C.

HARLOW AND SAWBRIDGEWORTH GASLIGHT AND COKE COMPANY.
WANTED, a Stoker. Shovel charging. Constant Employment. Seven Days.
Apply, stating Wages required, and giving Age and Reference to
E. F. PARKER,
Harlow. Secretary.

WANTED, a good Gas-Fitter. One accustomed to laying Mains, Services, fixing Cookers, and General Gas-Works Repairs preferred. Wages 30s. per week.
Apply, stating Age, Experience, and enclosing *copies* of Testimonials, to
T. H. ALDERSON,
Engineer and Manager.
Gas-Works, Selby.

WANTED, in a South Coast TOWN, a GAS-FITTER, well up in Iron and Compo. Work, Mains and Servicing, and able to do Gas-Works Smithing. Permanency and good Wages to a competent Man. Preference will be given to a Young Married Man.
Apply, by letter, stating Age and Experience, to No. 3391, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

HIGH WYCOMBE GASLIGHT AND COKE COMPANY, LIMITED.
WANTED, by the above-named Company, a GAS-FITTER. Age about 30 to 40. Accustomed to Iron and Compo., Slot, and ordinary work. Wages 30s. per week.
Application to the undersigned, with *copies* of Testimonials.
J. FRED. WICKS, C.E.,
Engineer and Secretary.

GUILDFORD GASLIGHT AND COKE COMPANY.
WANTED, at once, by the Directors of this Company an experienced and competent GAS MANAGER to take charge of their Gas-Works. (Annual Make, 135 millions).
He must have a practical knowledge of the Manufacture of Coal Gas, Carburetted Water Gas, and Sulphate of Ammonia, upon the most approved modern Systems, and have the entire control of the same. Salary £250 per annum. Residence, Rates, Coal, and Gas free.
Applications, in Candidates' own Handwriting, accompanied by not less than three Testimonials of recent Date, to be sent to the Chairman, Guildford Gas Company, not later than Dec. 15, 1899.
WILLIAM TITLEY,
Secretary.
Gas Offices, Guildford,
Nov. 29, 1899.

BOROUGH OF COLNE.
(GAS DEPARTMENT.)
ASSISTANT MANAGER.
THE Gas Committee invite Applications for the position of ASSISTANT GAS MANAGER. Salary £100 per annum.
Any person applying may obtain list of duties which have to be performed from the undersigned.
Applications, stating Age and Experience, enclosing not more than three recent Testimonials, must be addressed to the Chairman of the Gas Committee, endorsed "Assistant," and delivered at the Gas-Works not later than Noon on Thursday, Dec. 14, 1899.
FRED. THORPE,
Engineer and Manager.
Gas-Works, Colne, Lancs.,
Nov. 28, 1899.

URBAN DISTRICT COUNCIL OF LYMM.
TO GAS MANAGERS.
THE Urban District Council of Lymm desire to receive applications for the appointment of a MANAGER at their Gas-Works in Lymm, Cheshire.
Salary £140 per annum, with House, Coal, Gas, and Water.
The Manager will be required to enter upon his Duties as soon as he is appointed.
For Particulars as to Duties, &c., apply in writing to the Clerk.
Applications, in Candidates' own handwriting, stating Age and Qualifications, with *copies* of three Testimonials (which will not be returned), must be sent to the undersigned on or before the 16th day of December inst., marked "Application for Gas Manager."
The Council reserve the right of rejecting all or any applications.
By order,
W. MULLARD,
Clerk to the Council.
Council Offices, Lymm,
Dec. 1, 1899.

GAS COAL ROYALTY.
TO LET—Oxclose Royalty, situated about 8 Miles from the Shipping Ports of Tyne Dock and Sunderland on the River Wear, containing 300 acres, or thereabouts.
The Seams under the Estate are: The Five Quarter Main Coal, Maudlin, Brass Hill, and Hutton Seams.
There are two Shafts sunk to the Hutton Seam, which is met with 104 fathoms from the surface.
These Seams have been proved, and are being worked in the immediate neighbourhood.
For further Particulars, apply to PERCY STEPHENS, Esq., Whitworth Estates Office, Spennymoor, Co. DURHAM; or to WILLIAM LISHMAN, Esq., Mining Engineer, Witton-le-Wear, R.S.O., Co. DURHAM.

WANTED, King's Treatise on Gas Manufacture (three Volumes). Must be in good condition. State lowest Cash Price.
Address No. 3394, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

IRON ROOF for Sale, 132 feet long by 53 ft. 4 in. Span, in first-class condition.
Apply to CLAYTON, SON, AND CO., LIMITED, Hunslet, LEEDS.

ENGINES and Exhausters, from 3500 to 30,000 cubic feet per hour, in Stock, ready for delivery. No reasonable offer refused.
J. F. BLAKELEY, Thornhill, DEWSBURY.

OIL-WAGGONS for Sale. Eight New CYLINDRICAL TANK-WAGGONS, built to latest Railway requirements.
Apply, by letter, to No. 3395, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

RETORT IRONWORK.
RIVETED Wrought-Iron U Hydraulic MAINS, with 5-inch Pipes, 20 in. by 15 in., and 21 in. by 15 in. ∩ MOUTHPIECES in sets of Six and Seven complete. Equal to New, and Cheap.
J. F. BLAKELEY, Thornhill, DEWSBURY.

ONE Hundred Cast-Iron Lamp Columns FOR SALE.
Particulars of the undersigned
E. G. SMITHARD,
Engineer and Manager.
Gas-Works, King's Lynn,
Nov. 15, 1899.

THE Broughty Ferry Gas Department have FOR SALE four 12-feet square PURIFIERS, with Four-Way Valves and Connections complete. Were erected new in 1891. Have planed Joints, and are of modern design. Have been replaced by larger ones.
ALEXR. WADDELL,
Engineer and Manager.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE—A 3-Horse Power Crossley (Latest Patent) "OTTO" GAS-ENGINE. Quite new; has only done six months' light work.
Address No. 3385, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE.

THE Wokingham Corporation Gas-Works, having just completed the enlargement of their PLANT, have FOR DISPOSAL the following, all in good condition: Three 6 feet square PURIFIERS, STATION METER, CONDENSERS, and SCRUBBER.
Full Particulars upon application to
H. G. BATES,
Manager, &c.

FOR SALE—A Second-Hand Laycock and Clapham's Patent "ECLIPSE" WASHER-SCRUBBER, in very good condition. Size 6 ft. 9 in. by 6 ft. 9 in. by 21 ft. long, with 18-inch Valves and Connections, Engine and Driving Gear complete.
Apply to Messrs. NEWTON, CHAMBERS, AND CO., LIMITED, Thorncliffe Iron-Works, near SHEFFIELD, where the Apparatus can be seen in pieces.

ILFORD GAS COMPANY.

FOR SALE—An Engine and Exhauster in good condition with Stone Bed, Two 8-inch DISC VALVES and CONNECTIONS, also GOVERNOR and BYE-PASS for same.
Offers are invited for the above.
J. H. BROWN,
Engineer and Manager.

ILFORD GAS COMPANY.

TENDERS FOR GAS-MAINS.

THE Directors of the Ilford Gas Company are prepared to receive TENDERS for the supply and delivery to Ilford Station, G.E. Railway, or in Barges alongside Company's Wharf, of 3000 4-inch SPIGOT and SOCKET PIPES, and 1000 yards of 6-inch SPIGOT and SOCKET PIPES. Each Pipe to weigh 164 lbs. and 276 lbs. respectively.
Sealed Tenders, endorsed "Tender for Pipes," to be delivered to Jno. Denney, Esq., Secretary, Ilford Gas Company, not later than Monday, Dec. 11, prox.
J. H. BROWN,
Manager.
Gas-Works, Ilford,
Nov. 22, 1899.

CITY OF LEEDS.
(GAS DEPARTMENT.)

THE Gas Committee of the Leeds City Council are prepared to receive TENDERS for the supply of FIRE-CLAY RETORTS, FIRE-BRICKS, FIRE-BRICK LUMPS, and FIRE-CLAY.
Specification and Form of Tender may be obtained on application to the undersigned.
Tenders, endorsed "Fire Goods," addressed to the Chairman of the Gas Committee, Municipal Buildings, Leeds, will be received not later than Saturday, the 16th inst.
The Committee do not bind themselves to accept the lowest or any Tender.
R. H. TOWNSLEY,
General Manager.
Dec. 2, 1899.

CORPORATION OF LEICESTER.

CAST-IRON PIPES.

THE Gas and Electric Lighting Com-mittee of the above Corporation are prepared to receive TENDERS for the supply and delivery of the necessary CAST-IRON PIPES and CONNECTIONS, from 2 inches to 24 inches in diameter, required during the Twelve Months ending the 31st of December, 1900.
Specification and Form of Tender may be obtained from the Engineer.
Tenders, addressed to Alderman Lennard, J.P., Chairman, and endorsed "Tender for Cast-Iron Pipes, &c.," to be delivered at these Offices, not later than Eleven o'clock a.m., on Saturday, Dec. 9, 1899.
The Committee do not bind themselves to accept the lowest or any Tender.
ALFRED COLSON, M.Inst.C.E.,
Engineer and Manager.
Offices: Millstone Lane,
Leicester, Dec. 1, 1899.

LIVERPOOL UNITED GASLIGHT COMPANY.

AMMONIACAL LIQUOR.

THE Directors of the Liverpool United Gaslight Company are prepared to receive TENDERS for the AMMONIACAL LIQUOR produced at their several Works for a term of Three Years from April 1, 1900.
The quantities of Ammoniacal Liquor produced per annum are estimated to be as follows; but the same cannot be guaranteed, and may be more or less:—

	Gallons.
At the Athol Street Works, about	1,000,000
" Eccles Street " "	820,000
" Caryl Street " "	820,000
" Linacre " "	4,000,000

Tenders will be received for the whole or for one or more of the Works separately.
The Directors reserve to themselves the right to accept any Tender, in part or in whole, and do not bind themselves to accept the highest or any Tender.
Full Particulars and printed Forms of Tender can be obtained on application to the undersigned at the Gas Office, Duke Street, Liverpool, to whom sealed Tenders (on the printed form only) must be delivered at or before Ten a.m., on Monday, Dec. 18, 1899, endorsed "Tender for Ammoniacal Liquor."
By order,
WILLIAM KING,
Engineer.
Gas Office, Duke Street,
Liverpool, Nov. 23, 1899.

REMOVAL OF GASHOLDER.

TENDERS required for taking down and re-erecting Gasholder.
For further Particulars, apply to the MANAGER, Gas-Works, Rickmansworth, HERTS.

TAR.

THE Hythe and Sandgate Gas Company invite TENDERS for the surplus TAR produced at their Works at Hythe, Kent, during the Year 1900.
Tenders to be sent to me before Twelve o'clock at Noon on the 20th inst.
Particulars on application to the undersigned.
ROBERT JOHN SIDLE,
Secretary.
Hythe, Dec. 2, 1899.

COUNTY BOROUGH OF STOCKPORT.
(GAS AND ELECTRICITY DEPARTMENT.)

TO IRONFOUNDERS.

THE Gas and Electricity Committee are prepared to receive TENDERS for 2000 Yards of 3-inch, and 500 yards of 4-inch CAST-IRON MAINS, and also for IRREGULAR CASTINGS.
Weights, &c., and Forms of Tender can be obtained on application to the Engineer, Mr. S. Meunier, Portwood Gas-Works, Stockport.
Tenders, endorsed "Mains," addressed to the Chairman of the Gas and Electricity Committee, Stockport, must be sent in on or before Wednesday, the 13th of December inst.
The resolution of the Council that Contractors will be expected to pay the Standard Rate of Wages paid in the District will apply to this Contract; and the Committee do not bind themselves to accept the lowest or any Tender.
By order,
ROBERT HYDE,
Town Clerk.
Stockport, Dec. 2, 1899.

EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.

CIRCULAR GIRDER ROOF.

THE Commissioners are prepared to receive TENDERS for the construction of a CIRCULAR GIRDER ROOF, covering a Building 386 feet long by 100 feet span.
Specification, with Schedule of Quantities and Form of Tender, may be obtained upon application to the Chief Engineer and Manager, Mr. W. R. Herring, Gas-Works, Edinburgh, where Detailed Drawings may be inspected.
The Tender Forms supplied must be filled in and signed by a Principal or a Declared Agent of the parties tendering, and returned undetached from the Specification, and addressed to the undersigned, at or before Ten a.m., on the 9th day of December next, 1899, sealed and endorsed "Tender for Circular Girder Roof."
The Commissioners do not bind themselves to accept the lowest or any Offer.
JAMES MC G. JACK,
Clerk.
25, Waterloo Place,
Edinburgh, Nov. 17, 1899.

DOUGLAS (ISLE OF MAN) GASLIGHT COMPANY.

TO GASHOLDER MAKERS.

THE Directors of the above Company are prepared to receive TENDERS for the STEEL and IRONWORK required in the construction and erection of a STEEL GASHOLDER TANK, 112 feet in diameter, and 24 ft. 9 in. deep, and a SINGLE-LIFT GASHOLDER, with Guide-Framing, Inlet and Outlet Pipes, and Connections to same.
The Specifications and Drawings may be seen at the Offices of Messrs. Thomas Newbigging and Son, Engineers, 5, Norfolk Street, Manchester.
Copies of the Bill of Quantities and Forms of Tender may be obtained from the Engineers on payment of Three Guineas, which will be returned on receipt of a *bonâ-fide* Tender.
Sealed Tenders, endorsed "Gasholder, Contract No. 1," and addressed to the Chairman, Gaslight Company, Douglas (I. of M.), to be sent so as to reach me not later than noon on Saturday, the 16th inst.
The Directors do not bind themselves to accept the lowest or any Tender.
CHAS. H. KAY,
Manager and Secretary.
Gas Office, Douglas,
Dec. 1, 1899.

SALE BY TENDER OF £5000 FIVE PER CENT. PREFERENCE STOCK
OF THE
COLNEY HATCH GAS COMPANY.
(INCORPORATED BY ACT OF PARLIAMENT).

Ranking for a Dividend from the 1st of January, 1900.
Minimum Price of Issue £125 per £100 Stock.

TENDERS for £5000 Five per Cent. PREFERENCE STOCK, authorized by the Colney Hatch Gas Company's Acts, 1866 and 1876, will be received not later than Wednesday, the 13th of December, 1899.
The Stock will be allotted in any sum being a multiple of £10, with a minimum allotment of £100 Stock.
Particulars and Forms of Tender may be obtained on application at the Offices of the Company; from Messrs. Gush, Phillips, Walters, and Williams, Solicitors, 3, Finsbury Circus, E.C.; from Mr. Ralph Homan, Stockbroker, 2, Austin Friars, E.C.; at the London and Westminster Bank, Limited, Lothbury, London, E.C.; and at the London and Provincial Bank, Limited (Southgate and New Southgate Branches).
By order of the Directors,
ERNEST L. BURTON,
Secretary.
Secretary's Offices:
Nos. 5 & 6, Great Winchester Street,
Old Broad Street, London, E.C., Nov. 25, 1899.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.
He also undertakes the issuing by AUCTION of GAS and WATER STOCKS and SHARES under Parliamentary Powers.
Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTHEND GAS COMPANY.

ISSUE OF £7000 ORDINARY STOCK.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Dec. 12, at Two o'clock, in Lots.
Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
ALDERSHOT GAS AND WATER COMPANY.

200 £10 "E" FIVE PER CENT. PREFERENCE SHARES
TO BE SOLD, BY AUCTION BY

MR. ALFRED RICHARDS, at the Mart, E.C., on Tuesday, Dec. 12, 1899, at Two o'clock, in Lots.
Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By Order of the Trustees of Mrs. Mary Randall, deceased, and the Executors of Wm. Boards, Esq., deceased.

STOCKS AND SHARES
IN THE
TOTTENHAM AND EDMONTON GAS COMPANY,
HARROW AND STANMORE GAS COMPANY,
AND COLNEY HATCH GAS COMPANY.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Dec. 12, at Two o'clock.
Particulars of the AUCTIONEER, as above.

THE GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the TRANSFER BOOKS of this Company, so far as they relate to DEBENTURE STOCK AND BONDS, WILL BE CLOSED at One o'clock p.m. on Saturday, the 9th prox., for the Half Year ending on the 31st prox., and will be RE-OPENED on the Morning of Monday, the 11th prox.
The Interest for the Half Year will be payable on the 1st of January next to the Proprietors registered on the closing of the Books.
By order,
JOHN WILLIAM FIELD,
Secretary and General Manager.
Chief Office: Horseferry Road,
Westminster, S.W., Nov. 28, 1899.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the TRANSFER BOOKS of this Company, so far as they relate to DEBENTURE STOCK, WILL BE CLOSED at Ten o'clock forenoon on Friday, the 8th inst., for the Half Year to the 31st of December, 1899, and will be RE-OPENED on Friday, the 15th inst.
The Interest for the Half Year will be payable on the 1st of January next to the Proprietors registered on the closing of the Books.
By order of the Board,
JAMES RANDALL,
Secretary.
Gas Offices, Willoughby Lane,
Tottenham.

EAST LONDON WATER-WORKS COMPANY.

NOTICE is Hereby Given, that the TRANSFER BOOKS in respect both to the FOUR-AND-A-HALF PER CENT. and THREE PER CENT. DEBENTURE STOCKS, WILL BE CLOSED from the 14th of December to the 31st of December inst., inclusive, and RE-OPENED on the 1st of January, 1900.
By order,
I. A. CROOKENDEN,
Secretary.
St. Helen's Place, Bishopsgate, E.C.,
Dec. 2, 1899.

EAST LONDON WATER-WORKS COMPANY.

ISSUE OF £150,000 THREE PER CENT. DEBENTURE STOCK,
UNDER THE COMPANY'S STATUTORY POWERS.

NOTICE is Hereby Given, that the Directors are prepared to receive TENDERS for the above ISSUE, bearing Interest at Three per Cent. per annum, less Income-Tax, and redeemable at par after the expiration of 25 Years from the date of issue, subject to Six Months' Notice being given by the Company.
Tenders must be delivered at the Company's Offices, 15A, St. Helen's Place, Bishopsgate Street, E.C., not later than Twelve o'clock noon, on Thursday, Dec. 14 ensuing.
Particulars and Conditions, together with Form of Tender, may be obtained at the said Offices, or will be forwarded on application.
By order of the Court of Directors,
I. A. CROOKENDEN,
Secretary.
15A, St. Helen's Place,
Bishopsgate Street, E.C., Nov. 15, 1899.

A NEW Style of Hydraulic Main. No more thick Tar in the Main. Specification and a Photograph of the Machine, and how to make and fit it up, can be obtained from the Inventor for 10s. 6d.
S. CARPENTER, Ryde House, 28, Woodhouse Grove, EAST HAM.

SALE BY TENDER OF £5000
FIVE PER CENT. PREFERENCE STOCK
OF THE
NORTH MIDDLESEX GAS COMPANY.
(INCORPORATED BY ACT OF PARLIAMENT).

TENDERS for £5000 Five per Cent. PREFERENCE STOCK, authorized by the North Middlesex Gas Company's Act, 1895, will be received not later than Friday, Dec. 8, 1899.
The Stock will be allotted in any sum being a multiple of £10, with a minimum allotment of £50 Stock.
Particulars and Forms of Tender may be obtained on application at the Offices of the Company; from Messrs. Merriman, Pike, and Merriman, Solicitors, 25, Austin Friars, E.C.; at the Union Bank of London, Limited, 2, Princes Street, E.C.; and at the London and South-Western Bank, Limited, Church End, Finchley.
By order of the Directors,
ERNEST L. BURTON,
Secretary.
Mill Hill, Hendon, N.W.,
Nov. 18, 1899.

Now Ready, 120 Pages, Demy 8vo., Bound in Stiff Cloth Cover, Lettered, Price 5s. Post Free,
THE
VALUATION
OF
GAS, ELECTRICITY, & WATER WORKS FOR ASSESSMENT PURPOSES
— SECOND EDITION —
By THOMAS NEWBIGGING, M.Inst.C.E., and WILLIAM NEWBIGGING, Assoc.M.Inst.C.E.
WITH AN APPENDIX OF DECIDED CASES.
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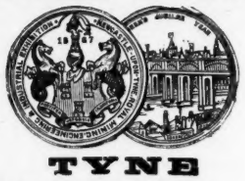
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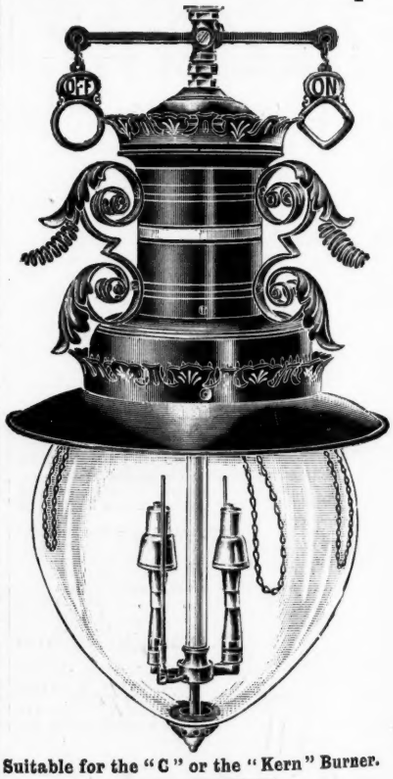

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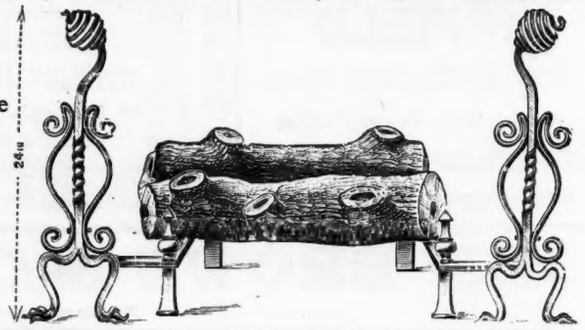

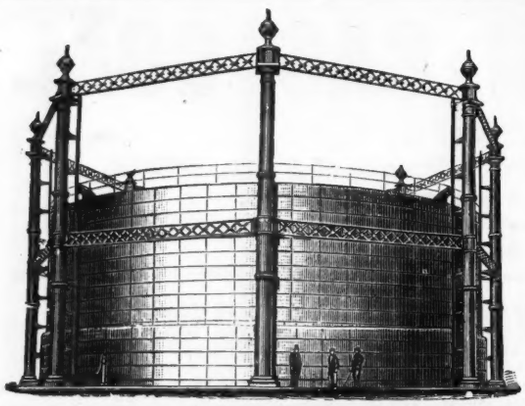

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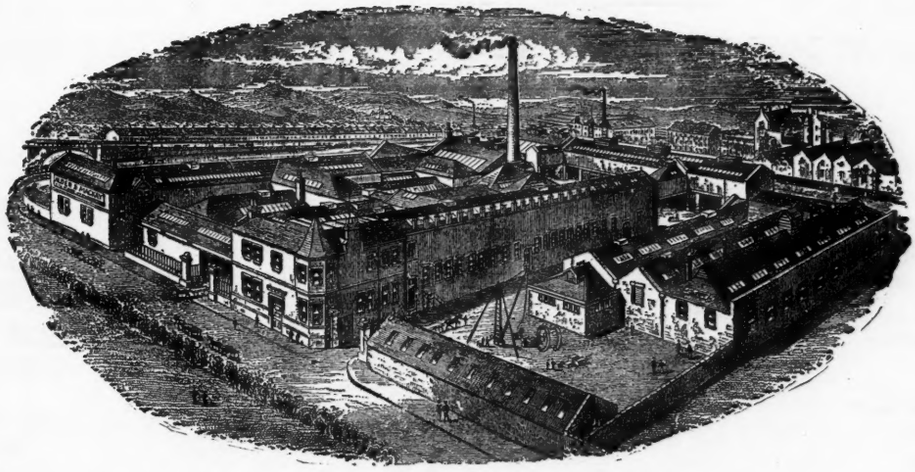

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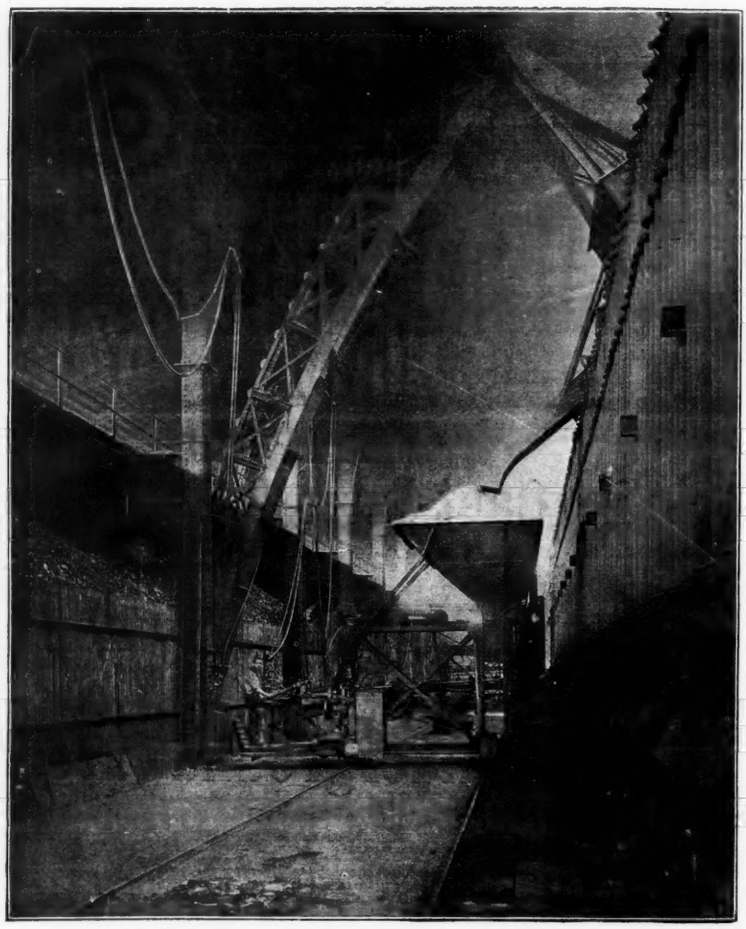

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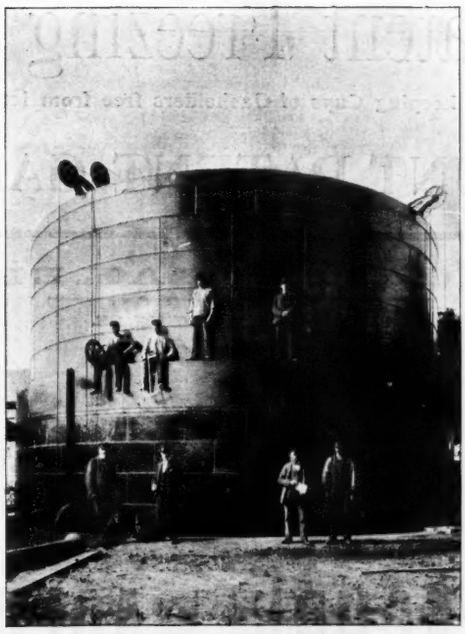

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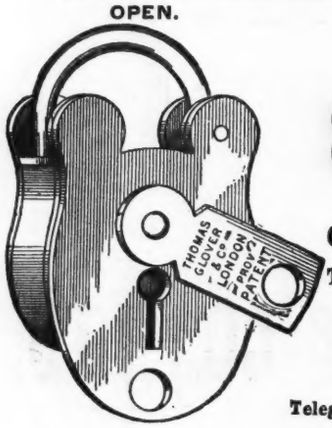

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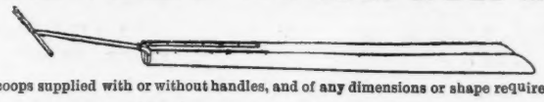

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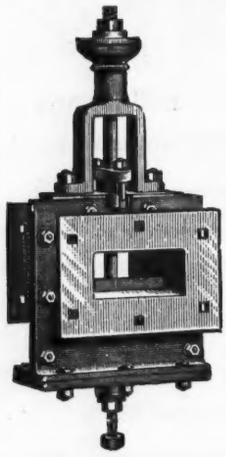

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